



Toolbox Talk

February 2023



Electrical Safety

Working near electricity is dangerous and accidents can often be fatal. Because no device can offer you 100% protection from electrocution, it's essential you remember to keep safe.

It doesn't take a lot of electricity to kill you. The amount of current needed to light an ordinary 60-watt light bulb is five times what can kill a person. So, all electrical equipment on work sites should be considered potentially deadly.



Electrical Shock and what is it?

An electric shock is the tingling sensation or muscular contraction that a person experiences when an electrical current passes through the body. An electric shock can severely burn or kill if the muscle contraction is severe enough to stop the heart. This muscle contraction will in many cases cause the victim to remain firmly gripped to the source of electrocution, particularly where power tools or leads are being used.

The human body conducts electricity. Even low currents may cause severe health effects. Spasms, burns, muscle paralysis, or death can result depending on the amount of the current flowing through the body, the route it takes, and the duration of exposure.




Effects of Electric Current on the Human Body

CURRENT LEVEL (Milliamperes)	PROBABLE EFFECT ON THE HUMAN BODY
Below 1 mA	Generally not perceptible.
1 mA	Might feel a faint tingle.
5 mA	Slight shock, but not painful or disturbing. The average individual can let go of the current source. However, strong involuntary actions can lead to other injuries.
6-25 mA	Painful shock, loss of muscular control.
9-49 mA	The freezing current or let go range. The average individual cannot let go, but can be thrown from the current source.
50-150 mA	Extreme pain, respiratory arrest, severe muscular contractions. Death is possible.
151-2,000 mA	Rhythmic pumping action of the heart ceases. Muscular contraction and nerve damage occur. Death is likely.
Above 2,000 mA	Cardiac arrest, internal organ damage, and severe burns. Death is probable.

Electrical injuries


Electrical accidents are often fatal

There are two ways that electricity can cause harm.




ELECTRIC SHOCK

(ELECTRICITY THROUGH YOUR BODY)

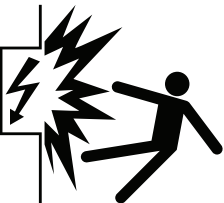


Can cause severe burns and potentially dangerous involuntary physical movements.



ARC FLASH

(RELEASE OF ENERGY)



Can result in blast injuries, lung injuries, ruptured eardrums, shrapnel wounds, severe burns, and blindness.

Common electrical hazards on a worksite

The electrical equipment you are using poses a big risk in the form of damaged equipment, incorrect tools for the job and tools being left on pose the biggest risk when it comes to the equipment itself.

The environment you are working in can have a number of hazards, such as power lines, underground services and excessive water. The electrical supply you are using can easily become overloaded when there are many contractors on site, check sockets are not overloaded and the supply is earthed. Use lifeguard boxes when available.

Workers themselves can be a hazard. Ensure your team is qualified and authorised to carry out electrical work. In addition, also keep an eye on fatigue and that people are not under the influence of drugs or alcohol.

It is also important to ensure no one else has the ability to switch on electrical equipment that you are working on without your knowledge.

Electrical repairs or modification of appliances or tools should only be carried out by a person holding a Current Practising License issued by the Electrical Workers Registration Board.

Test before you touch

Skilled employees, trained in electrical safety procedures, should make sure they understand and follow safety precautions. Those not trained to recognize and avoid electrical hazards, or not under the supervision of those qualified in electrical safety procedures, should avoid contact with electrical equipment and systems.

**Above all,
never assume that
the equipment or system
is de-energized.
Remember to always
TEST BEFORE
YOU TOUCH!**

- Understand the construction and operation of the electrical equipment and the hazards involved
- Identify all possible energy sources that could pose on-the-job hazards
- Know safety requirements and follow them
- Assess the energy potential
- Select the appropriate personal protective equipment (PPE). Remember, PPE must be worn until the electrical system is in a safe condition
- Complete a detailed job plan and communicate it to all coworkers
- Before working on or around electrical systems or equipment, identify the load circuits and disconnect. Remember, in some cases, turning power off may cause other hazards. Such hazards and additional guidance should be addressed in your work plan
- Use lock-out/tag-out procedures
- Verify that the equipment or system has been de-energized by testing
- Make sure your test equipment is working, both before and after you use it
- If at any time the job becomes more hazardous than anticipated, stop and revise the plans.

What to do if someone comes into contact with **Live Electric Current**

When a person comes into contact with a live electrical circuit of sufficient voltage to cause an electric shock your first priority is to eliminate the flow of current.

This typically is not just turning off the machine, equipment or tool . . . you must break the current at the source by switching off the circuit or by removing the plug from the socket in the case of a power tool.

On some occasions this may not be possible to do quickly enough. At this point your only option is to break the contact between the current and the person. This can be done by either moving the person or moving the electrical source (wire) so they are no longer in contact.

To do this safely without harm to yourself you must not be another conductor for the electric path to ground. Insulate yourself if you must move a person away from a live contact - wear electrical or dry gloves or cover your hands with cloth and stand on dry insulating material like cardboard, wood or clothes.

Ensure you have good footing and will not slip or fall when trying to move the person. Utilise something non-conductive to release the person or move the source from the person. The following are some common items:

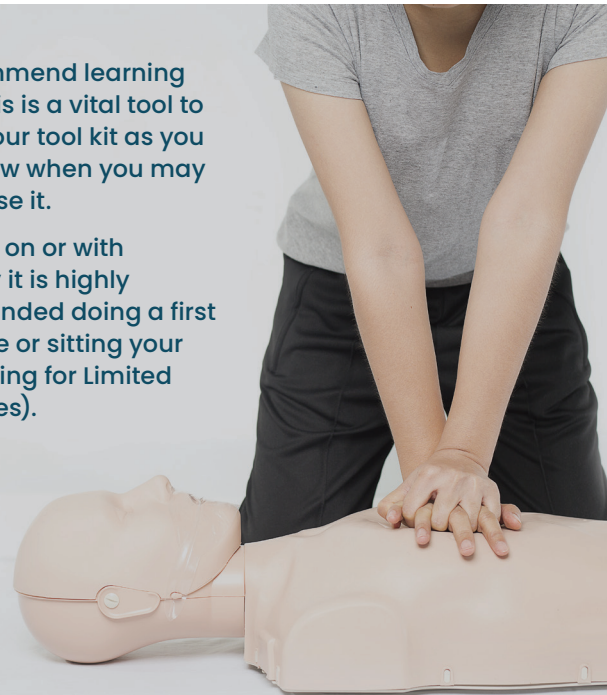
- Professional non-conductive release hook (best option and relatively inexpensive)
- Long piece of lumber (2x4, etc)
- Broom Handle
- Leather belt (cut off buckle)
- Dry Rope
- Blanket, clothes or other dry non-conductive materials

Once the person is released from the live current check the persons breathing and heart beat. If breathing has stopped, but the persons pulse is present, commence mouth-to-mouth resuscitation.

If heartbeat has stopped, commence cardiopulmonary resuscitation (CPR). If both breathing and heartbeat have stopped, alternate between mouth-to-mouth resuscitation and CPR. Use blankets to keep the person warm and raise the persons legs slightly above the level of the head to lessen the effects of shock.

We recommend learning CPR as this is a vital tool to have in your tool kit as you never know when you may need to use it.

If working on or with electricity it is highly recommended doing a first aid course or sitting your TLC (Training for Limited Certificates).



Even the smallest shock can have a **hair-raising effect!**





Remember **STAAR** = Good Work Practices **Stop Think Assess Act Review**

Health and safety reps

Your Health and Safety (H&S) Reps are here to represent and assist you (apprentices) in all health and safety matters. If you would like to talk to an H&S Rep or have any H&S issues, feel free to contact any one of them. They will be more than happy to help.

Waikato

Elizabeth Humberstone 027 806 8879

Tauranga

Tuhi Worrell-Webb 022 164 7138

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Alan Lockett 027 239 6197

Health and safety summary December/January

Remember to keep reporting accidents and incidents so we can all learn from them.

It's great to see near misses being reported and we encourage you to keep reporting these so we can prevent an actual injury happening.

- S** Stop
- T** Think
- A** Assess
- A** Act
- R** Review

Lost time injuries	4
First aid injuries	4
No injury	3
Medical treatment injuries	1
Near miss	0
Non work injuries	5
Restricted work injuries	1
Pain/discomfort	1
Total Incident	19

Incidents

First aid injury	Back sprain (LATE REPORTED)
Nature of injury	Manual handling
Incident	Apprentice was lifting pipes which resulted in a back sprain. Apprentice went to the doctor for assessment and was cleared to return to work the same day
Immediate actions taken	Went to doctor for assessment
Corrective actions	Communicated to apprentice about the importance of reporting events as soon as they happen
Property damage	Roof lifted off building
Nature of injury	Weather event - Tornado
Incident	Tornado swept through causing severe damage to the building (ripping part of the roof off). No one was hurt
Immediate actions taken	Waited for the storm to pass before securing the building from further damage and await repairs
Corrective actions	No corrective actions were identified as caused by a weather event that was beyond the control of any person
Medical treatment injury	Metal in eye
Nature of injury	Foreign body
Incident	Apprentice was welding for 2 days. They were wearing a welding helmet and eye protection at the time. The following day their eye was red and sore and suspected arc eye so went to doctor for further assessment. On investigation, the doctor found a foreign body in the eye and removed it
Immediate actions taken	Sent to doctor for further assessment
Corrective actions	Follow STAAR process. Remove gloves and ensure hands are clean before touching eyes. Brush off clothing and hair after working to get rid of any dust and any potential metal fragments
Restricted work injury	Contusion to thumb
Nature of injury	Manual handling
Incident	Apprentice was lowering down a scaffolding pole (which had been handed to them) that had a clamp on the pipe. As they were lowering the pipe their hand hit the hand rail and the clamp on the pipe hit their finger between the pipe and hand rail causing a contusion
Immediate actions taken	First aid applied and went to doctor for further assessment
Corrective actions	Remove clamps from pipes before lowering Apply STAAR to their work practice
Lost time injury	Carpal tunnel syndrome
Nature of injury	Welding
Incident	Initially reported as pain with a diagnosis of carpal tunnel syndrome attributed to welding requiring surgery. Upgraded to LTI due to surgery 14/12/2022
Immediate actions taken	No immediate actions taken
Corrective actions	Required surgery to right hand, scheduled to have left hand done in 2023

Incidents

No injury	Electric shock
Nature of injury	Contact with electricity
Incident	Apprentice was fitting off an Isolator. They stripped cables back, and when they were putting them into the terminals they touched the copper and it was live and they received an electrical shock. As it was on a fit off, it should not have been live. It was found that another electrical company had connected it when they were not supposed to
Immediate actions taken	Reported to host who are discussing incident with the building company
Corrective actions	Under investigation
No injury	No injury
Nature of injury	Hit by moving object
Incident	Apprentice had clamped their workpiece with 1 clamp. As they were working the workpiece come off the clamp and hit them fortunately there was no injury sustained
Immediate actions taken	No immediate actions taken
Corrective actions	Communicated to apprentice to be aware of surroundings when completing tasks and think about body position in relation to the task. Apply STAAR to their work practice
Lost time injury	Knee sprain
Nature of injury	Other muscular stress
Incident	The apprentice had been working up a ladder. As they stepped off the bottom rung of the ladder onto the ground their weight shifted causing their knee to buckle inwards
Immediate actions taken	None taken. Apprentice left work to get doctors assessment
Corrective actions	No corrective actions have been put in place as no specific incident happened to cause the injury and there were no witnesses when the incident occurred
Lost time injury	Knee sprain
Nature of injury	Other muscular stress
Incident	The apprentice had been working up a ladder. As they stepped off the bottom rung of the ladder onto the ground their weight shifted causing their knee to buckle inwards
Immediate actions taken	None taken. Apprentice left work to get doctors assessment
Corrective actions	No corrective actions have been put in place as no specific incident happened to cause the injury and there were no witnesses when the incident occurred
First aid injury	Grazing to leg
Nature of injury	Slip, trip, fall on same level
Incident	Apprentice was walking down concrete stairs and slipped causing grazing to their right leg
Immediate actions taken	First aid applied
Corrective actions	Communicated to apprentice to be more aware when walking downstairs and holding on to handrails

Incidents

First aid injury	Metal fragment in eye
Nature of injury	Foreign body
Incident	Apprentice rubbed their eye and a piece of metal had entered the eye
Immediate actions taken	First aid applied and went to doctor for further assessment
Corrective actions	Ensure hands are clean before touching eyes. Brush off clothing and hair after working to get rid of any dust and any potential metal fragments
First aid injury	Sprain to hip
Nature of injury	Manual handling
Incident	Apprentice was carrying a belt guard down some stairs with another co-worker. As they were sidestepping down the stairs, their foot rolled to the side and I strained their left hip
Immediate actions taken	First aid applied
Corrective actions	Ordered proper insoles for their shoes so their feet can't roll around
Lost time injury	Back sprain
Nature of injury	Manual handling
Incident	Apprentice was moving a 125KG radiator from a crane with a co-worker onto the fourth floor while on scaffolding. The apprentices footing slipped on a loose piece of scaffolding, tweaking their back, but didn't drop the radiator
Immediate actions taken	First aid applied and went to doctor for further assessment
Corrective actions	Under investigation by host
No injury	Electric shock
Nature of injury	Contact with electricity
Incident	Apprentice was carrying out planned maintenance checks on a supply air fan located on the roof. They isolated the fan at the isolator and opened up the isolator to check terminals and take current. They noticed that the supply wire to the fan from the isolator was slightly loose and the wire was a bit frayed. With the isolator still off, they disconnected the wire to the fan from the isolator terminal, checked the cable for voltage with my voltage tester and tidied up the wire with their pliers. While they were tidying up the wire with their pliers the apprentice received an electric shock. This could have been from the capacitor. They were able to let go of their pliers and move away from the fan after receiving the shock. The apprentice suffered no physical injuries. The apprentice then put back the wire into the isolator, closed up the isolator cover and turned it back on, fan ran okay, no damage caused to equipment
Immediate actions taken	The apprentice called their supervisor to inform them of what had happened. Supervisor instructed apprentice to seek medical attention and received an ECG
Corrective actions	Ensure enough time is allowed for the capacitor to discharge. No other actions required as the apprentice had completed job correctly