

Nirapon Electrical Safety Newsletter

Electricity is the lifeline of a factory...without safe electrical systems apparel production cannot happen.

More than 2000 years ago a Greek man named Thales, noticed that when amber was rubbed with silk it attracted feathers and other light objects. He had discovered static electricity. The Greek word for amber is 'elektron', from which we get 'electricity' and 'electronics'

In 1870, Thomas Edison built a DC electric generator and in 1879 the first fatal accident due to an electric shock was recorded.

A simple definition of "Electricity" can be described as the flow of electrons through a conductor.

Some materials are better at conducting electricity than others. The resistance of a material measures how well something conducts electricity. Some materials hold electrons very tightly, have high resistance and are good insulators such as rubber, plastic, cloth, glass and dry air. Other materials have some loosely held electrons, which move through them very easily and are considered good conductors such as copper, aluminum or steel.

The two key things to remember about electricity is that it must make a circuit and it will always seek the easiest path to earth or ground.



The flow to ground that electricity will follow is always the path of least resistance. This can be caused by a defect in electrical equipment or could be caused by an object coming into contact with defective equipment, such as a person.

Circuit breakers are essential safety devices installed to protect the circuit by preventing the electricity from making a circuit should a problem be detected in that circuit. A circuit breaker will drop the power if there is a defect or leakage to earth. This prevents an electrocution or a fire from starting. If circuit breakers are cutting the power, it means that there is a problem with the circuit and a competent electrician must be consulted to rectify the problem. Replacing the circuit breaker with a larger one is dangerous and is not a solution.



Circuit Breakers.

Must be the correct size with the correct size cable for the power required.

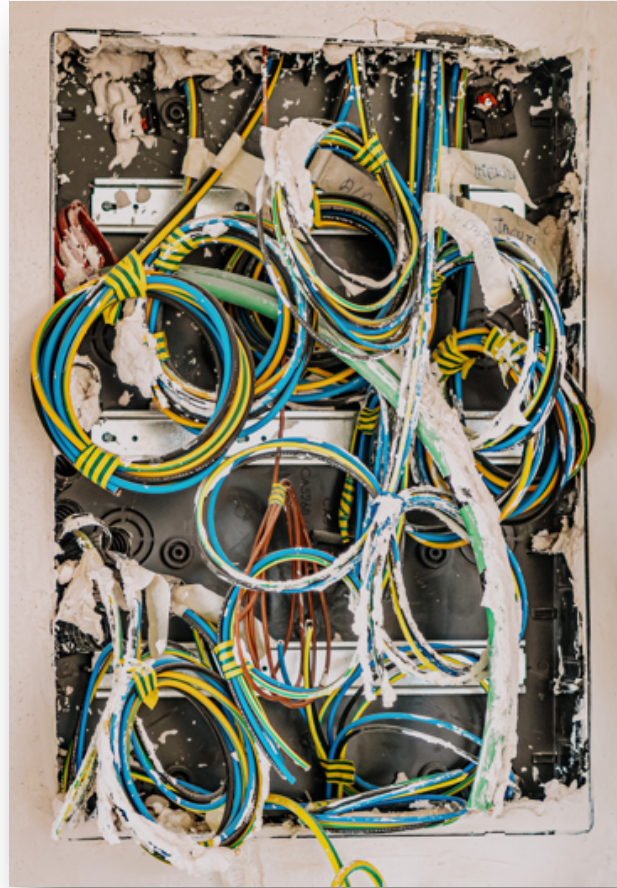


An Electrical Distribution Board Housing Circuit Breakers.

Distribution board should be locked at all times and accessed only by competent electrical engineers.

Electrical accidents are caused by circumstances that are varied and peculiar to the particular incidents involved. Closer examination usually reveals the underlying cause under two main headings:

- 1. A workplace with unsafe equipment, installations or conditions.** Some unsafe electrical equipment and installations can be identified, for example, by the presence of faulty insulation, improper grounding, loose connections, defective parts, ground faults in equipment, unguarded live parts, and underrated equipment. Inadequate maintenance can also cause equipment or installations originally considered safe to deteriorate, resulting in an unsafe condition.



Example of an unsafe electrical installation

If we consider the surroundings in a factory, such as storage facilities with the possibility of flammable vapours or gases, areas containing corrosive atmospheres (chemicals); as well as wet and damp locations are some unsafe environments that can have an effect on electrical safety. This is why spark proof lighting should be fitted in all storage areas and is one of the reasons why a factory needs to be protected from dampness, rainwater and have lightning protection systems installed.

- 2. Unsafe work practice**

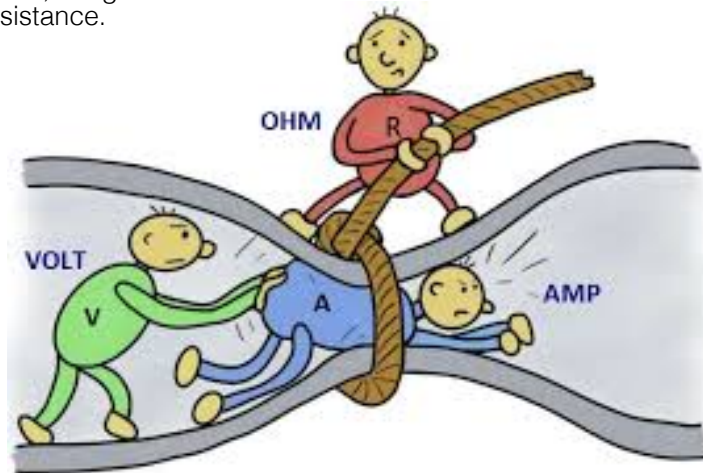
Unsafe practices include the failure to de-energize electric equipment when it is being repaired or inspected or the use of tools or equipment is too close to energized parts. Not having a rubber mat at every distribution board, or Perspex cover inside the cabinet, an unlocked distribution board cabinet or an engineer not having the correct tools and PPE.

Correct size circuit – Electrical Load Management

Refers to the system in place to match supply and demand.

Ohm-measurement of resistance, the smaller the cable, the greater the resistance.

Volt- measurement of electric force in the flow of electricity.

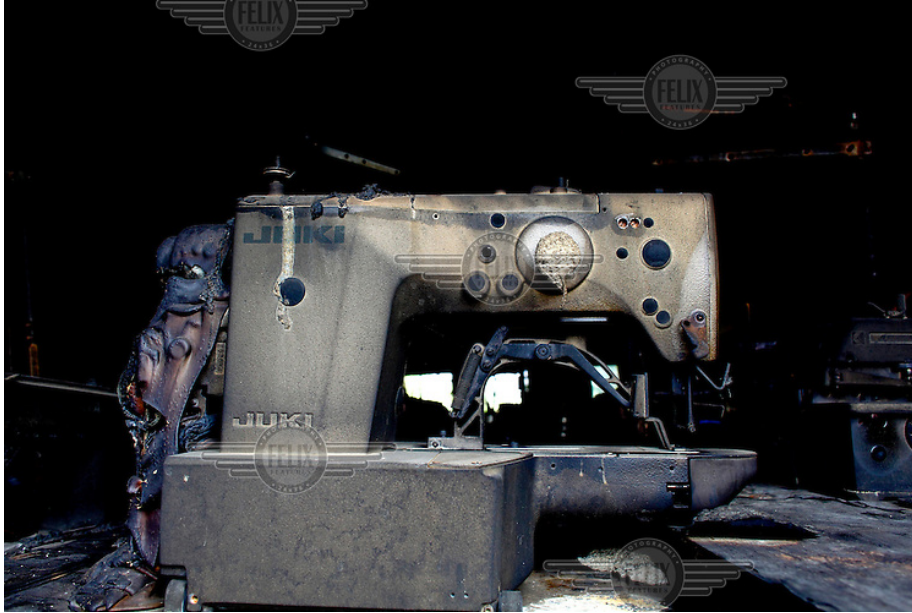


Amp-measurement of the current or the strength of the electricity.

Resistance is the same as friction and resistance or friction generate **HEAT**

The most common electrical safety issue found in factories is fitting circuit breakers that are too large for a circuit and/or the wiring is too small for the circuit. In either case this allows more electricity to flow than the circuit is designed to handle. This increases resistance and so more heat is created which leads to fires and also electrocutions as the circuit breakers are too big and less '*sensitive*' to any fault in the circuit.

In one instance a factory was found to have bypassed the circuit breakers completely meaning that the flow of electricity could not be interrupted by the circuit breakers if there was a problem. This was a very dangerous condition that could have led to a fatal electrocution or a serious fire.



Damage to a sewing machine following the use of an oversized circuit breaker.

How to assess if your current electrical system is safe:

If a circuit breaker keeps dropping it means that the circuit has a defect or the circuit is overloaded. A competent electrician should be called to find and repair the defect (***which could be a machine connected to the circuit***) or calculate the actual load on the circuit. A thermographic scan will also reveal any hotspots caused by areas of high resistance in the circuit. These scans of industrial electrical circuits should be carried out every 4-months and included in the 90-Day Management Guidance and Reporting Process whenever such a scan is completed.

