

OVERVIEW:



Machines have evolved over ages and have become an integral part of our life. Machine-related injuries constitute the highest number of permanent, partial disabilities, and rank third among all industrial workplace accidents. Most of these injuries are the result of employees performing unsafe acts, using incorrect work procedures or bypassing safety guards and devices.

We at Liberty General Insurance Limited understand the importance of machine safety interlocks. We intent to provide an understanding and measures for maintenance of such interlocks.

Machine safety interlocks are best applied, as part of or in conjunction with, existing machine guards and devices to help prevent personal injury or machine damage. This is accomplished by interrupting machine operation through isolating and withholding the source of energy.

Typical applications for machine interlocks are for removable or hinged guards, enclosures, gates, and movable barrier devices. Although most machine safety interlock applications are electrical, they can also be mechanical, hydraulic, pneumatic, or some combination of these types.



MACHINE INTERLOCK:



CASE STUDIES:

IN THE WORLD OF MANUFACTURING, MACHINE SAFETY IS A CRITICAL CONTROL FUNCTION OFTEN OVERLOOKED.



WORKER CRUSHED BY PLASTIC COMPACTING MACHINE – DELHI, 2019:

A 21-year-old man was crushed to death while working at a crushing machine in a plastic waste processing factory. The worker leaned into the machine to settle the crushed bottles when the shaft of the machine came down and crushed him from shoulder to the chest resulting into his death.

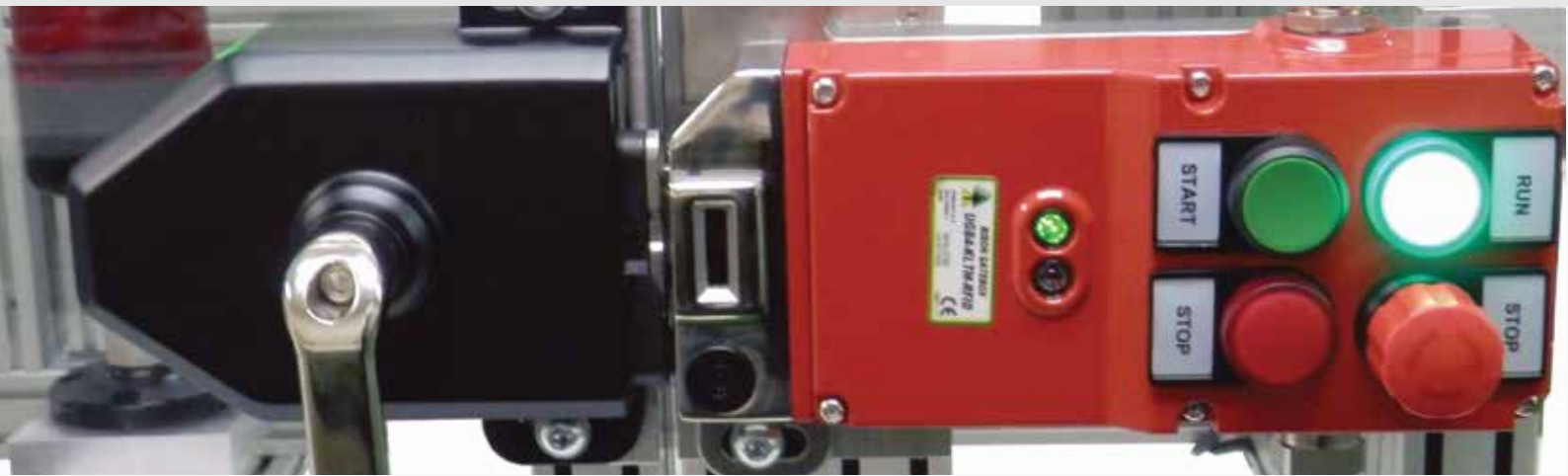
WORKER KILLED BY ROBOT WELDING MACHINE – MANESAR, 2015:

A 24-year-old worker was reportedly killed while working near a robotic welding machine when he was stabbed by one of its arms. During incident, job sheet got dislodged and the worker reached from behind the machine to adjust it. This was when welding sticks attached to the pre-programmed device pierced his abdomen and resulted in his death.



LEARNING –

Both the cases could have been averted in case there was a safety interlock which could have restricted power supply to machine while worker was in hazard zone.



FUNCTIONS OF INTERLOCKS

Depending on the machine or process equipment design and installation, an interlock should perform one or more of the following functions:

- Interrupt power to the machine or machine element when the guard or device is opened so that the cycle is ceased in mid-stroke.
- Prevent power from engaging until the guard or device is in the open position.
- Prevent entry, for a predetermined time period, into hazardous machinery or equipment after power supply interruption.
- Prevent a guard from opening until motion or hazard has ceased.
- Prevent motion of a machine element until guard or device is replaced to its closed position.



CAUSES OF INTERLOCK FAILURE:



There could be multiple reasons for failure of interlock systems such as:

- Removal of guard or interlock for repair, maintenance, or inspection.
- Removal of guard or interlock member to allow increased production or convenience of access.
- Interlock device broken or requiring repair with no replacement units available. Becomes a “temporary-permanent” condition.
- Permanent removal or defeat of interlock to avoid trouble or expense of repairing it.
- Contamination of electrical interlock by environmental conductive dusts or conductive liquids which may result into short circuiting of interlock circuits.
- Vibration teasing contacts – causing them to weld.
- Deterioration of interlock seals, causing sticking.

MEASURES TO AVOID ACCIDENTS:

Following practices can be incorporated to enhance and ensure health of installed interlock apparatus:

- Inclusion of interlock maintenance in Preventive Maintenance Schedule.
- Restriction over interlock bypass.
- Defining SOP (Standard Operating Procedure) for working with safety interlocks.
- Removal of guards or interlock members in any case should be strictly restricted.
- Periodic cleaning of interlock apparatus to avoid accumulation of conductive dusts or liquids which may result into short circuiting of interlock apparatus.



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IRDA Registration No. 150
CIN : U66000MH2010PLC209656