

The need for isolation for electrical work

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Principles

Introduction

The main requirements for safe work on or near high energy electrical systems/ sources usually require that **every effort is made to securely isolate the source of energy**, see: <http://www.theiet.org/factfiles/health/hsb58a-page.cfm> and <http://www.theiet.org/factfiles/health/hsb58b-page.cfm>. This will be as a result of a risk assessment.

Carrying out a risk assessment

To help identify the precautions that are necessary for carrying out the work safely a risk assessment should be performed.

The risk assessment process is shown in **Figure 1**, targeting to achieve the lowest Reasonably Practicable risk. In the case of a high energy electrical source the lowest Reasonably Practicable risk must be when the all electrical sources feeding the point of access have been de-energised i.e. the access point is electrically isolated.

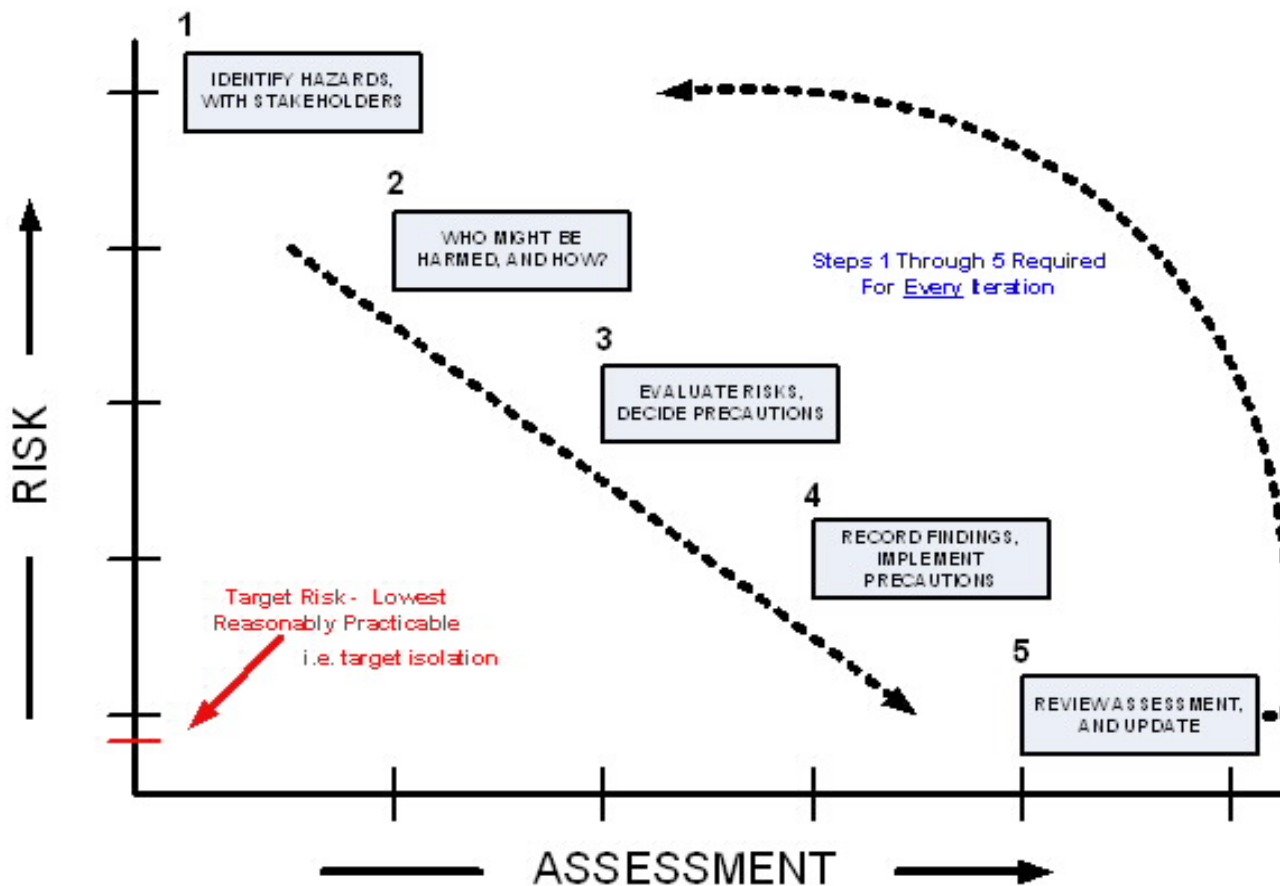


Figure 1. Risk Assessment Steps

When carrying out the risk assessment consider the following questions:

- Can the work be done while the point of access is isolated (i.e. with all electrical sources dead)?
- Does somebody have to enter the danger area?
- How often is the procedure necessary?
- What safeguards are built in?
- Are there any formal procedures?
- Is the worker trained to recognise the risks?
- Is there competent supervision?
- Have the risks from concurrent hazards been analysed?

What precautions should be taken?

Where possible the work should be carried out when all associated electrical sources of energy have been isolated. To achieve isolation may require planning, communication and co-operation of many departments particularly in a manufacturing process environment. If isolation is not possible then the work should only proceed if alternative precautions identified in the risk assessment can ensure adequate worker safety.

Electrical Isolation

By using an appropriate device the necessary point of access should be isolated from all its supply of electrical energy. All electrical installations have an isolation means at least at the consumption metering point. Isolation has the purpose of protecting against electrical hazards electric shock, burn and ballistics - the effects of arc flash. The points of electrical supply isolation must be marked and must be known by all necessary people in the organisation.

Devices that are suitable for isolation are specifically designed for this purpose. They provide sufficient physical separation between, say, the equipment's electrical circuit and its power supply and also give a positive indication of this separation. Accessing the point of isolation should not present additional danger, and there should also be adequate working space around it.

The isolation should remain secure so as to prevent a reconnection of the electrical supply. If an isolator cannot remain continuously under the direct control of the person working on the access point, then it should be locked off, and an appropriate warning notice posted at the point of isolation. This will ensure that subsequent re-energisation of the supply is under the control of the person working on the access point, thus averting any electric shock risk and preventing any unauthorised, unintentional or inadvertent re-energisation. It is essential that the effectiveness of isolation is verified by a competent person using appropriate means and with any requisite Personal Protection Equipment (PPE), before work commences on the access point.

Safe systems of work

The company safety rules should incorporate a written safe system of work based on the results of risk assessments, and this should include requirements for the isolation of high energy electrical system parts. It should highlight the tasks and situations for which secure isolation is required, and detail the appropriate procedures for achieving this.

People required to work on these high energy electrical system parts should understand these rules, be appointed, be suitably trained and be capable of undertaking such work safely i.e. be competent for the task as known to the organisation.

What if source of energy isolation truly cannot be achieved prior to work commencement?

Organisations must have a rigorous requirement for justification of live working. A risk assessment must be undertaken and documented for dealing with accessing the high energy electrical system/source. In the circumstance that accessing the system/source when it is live is the only option then consideration must be given to protecting all personal who have to be in the risk zone of the point of access, from the effects of arc flash. Risks due to poor design or maintenance of equipment, poor competence, and lack of information or human error should be considered. The objective is to mitigate the risk by engineering means such as containment, operational restrictions or remote operation, or the use of safe systems of work. Temporary shrouding or insulated tools may be required.

Any residual risk should be controlled with PPE as the last line of defence, see: <http://www.theiet.org/factfiles/health/hsb51c-page.cfm>

Immediately after the work

Before re-energising the circuit or circuits worked on it is necessary to make additional checks that it is safe to reapply the power.

UK Legislation and Implementation

More risk assessment details can be found on the HSE website: <http://www.hse.gov.uk/risk/>.

Further information

IET referenced Health and Safety Briefings:

- Safe Systems of Work: <http://www.theiet.org/factfiles/health/hsb32-page.cfm>

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