
# Arc flash risk management

ESUK is a specialist company concerned with the safe management of risk associated with all electrical work activities. With unrivalled years of experience, Electrical Safety have pioneered the European approach to Arc Flash hazard assessment and management. Paul Hopton explains

As an Electrical Safety Consultant, I meet many clients whilst helping them with their electrical problems. As part of this special feature on arc flash, I thought I would share with you some of my recent observations from around the World. The first thing to note is that the client's perception of arc flash can often be somewhat different to reality. For example, many people will be concerned about the arc flash risk on their high voltage network (HV>1000 Volts).

When we first meet, customers often want to discuss carrying out a study on their high voltage network. If you consider that the only way you can be injured by an arc flash event is if you are exposed to sufficient incident energy that it harms you. You need to consider two key things, the amount of energy that can be released during an arc flash incident and how you can come in to contact with that energy. If you think about it, as an electrical person working in a typical industrial environment you are more likely to encounter arc flash at low voltage than at high voltage for two main reasons:

1. there is likely to be more LV equipment on site than HV equipment
2. you are more likely to be working on or near LV equipment whilst it is energised

When carrying out arc flash incident energy calculations we find that high incident energy can often be found at LV and it is in fact just as prevalent at LV as it is at HV. ▶

The issue of corporate standards comes up regularly during my visits to clients, quite often American owned businesses operating in the UK will quote IEEE 1584 and NFPA 70E as the two standards that must be complied with. This generally does not cause an issue as NFPA 70E includes risk assessment and the principle of hierarchy of controls, with Personal Protective Equipment (PPE) being the control measure of last resort. This does however bring up the issue of PPE and the supply of PPE to businesses and sites that have not carried out an arc flash study. It is a requirement of the Personal Protective Equipment at Work Regulations 1992 that employers shall risk assess before instructing personnel to wear PPE and that the PPE provided should be appropriate for the risks involved. The incident energy calculations that we carry out as part of an arc flash study give you the severity of the hazard, the risk assessment process then considers how this hazard can be realised. If you have implemented a blanket PPE policy without first carrying out an arc flash study, you could be leaving yourself open to criticism under current legislation.

> **“The issue of PPE and the supply of PPE to businesees”**

It is important to note that there are many ways to reduce arc flash risk without the use of PPE. We could consider any of the following when trying to reduce the incident energy levels:

- Protection setting changes
- Protection scheme design changes
- Arc Flash Relays
- Use of current limiting fuses/breakers e.g. fast acting breakers or fuses
- System configuration can be used to reduce available fault current e.g. smaller kVA transformers
- Current limiting reactors
- Detect potential failures e.g. partial discharge monitoring; thermography; VESDA; maintenance inspection and test
- Decommission and remove redundant electrical equipment

As part of our arc flash studies for each piece of equipment that has an incident energy value above a certain value we consider what options are available to reduce the incident energy. We recommend the most appropriate option as well as providing an order of magnitude cost. We also give guidance on what might be an appropriate level of expenditure to comply with the “as low as reasonably practicable” (ALARP) requirements of legislation.

Finally, the Regulator’s expectations having been changing for many years when it comes to the management of arc flash risk. We were made aware recently of a business that was given an improvement notice by the HSE to carry out an arc flash risk assessment following a routine inspection. When I worked as a Technical Authority and in Corporate Engineering I had experience of HSE specialist inspectors asking about arc flash, and how we were managing the risk.

In conclusion, it is not difficult or expensive to manage arc flash risk. Arc flash events may be relatively infrequent, but they do happen, and the consequences can be fatal. Put your house in order, do an arc flash study and prevent an arc flash incident from happening on your watch. ER