Fixed Wiring in-service electrical inspections, why they are necessary and how they can benefit your business.

It’s a near certainty that your business uses electrical power in some way. Therefore, in order to manage risks and comply with the law, your fixed wiring needs to be inspected regularly. Meeting this requirement effectively, and ensuring that the benefits outweigh the costs, requires you to be familiar with the concept of fixed wiring inspection, and to know what approach to take.

Bear in mind, according to the HSE’s website (www.hse.gov.uk/electricity), about 1,000 people per year have an electrical accident and about 25 of those are fatal.

Definitions

The independent safety inspection industry tends to categorise electrical equipment and systems as follows:

- **PAT** – Portable Appliance Testing – for items like kettles.
- **Plant** – for items such as motors, welding equipment, fans and air conditioning units
- **Fixed wiring** – all the equipment required to distribute electrical power safely from the origin to all the plant, equipment and appliances at the relevant site. Fixed wiring includes conductors (e.g. cables and cords), connections (e.g. distribution boards), switching devices, protective devices (e.g. fuses, circuit breakers and residual current devices – RCDs), enclosures and, where applicable, fire barriers.

Fixed wiring’s broad definition means that its inspection can encompass little or much. At its simplest, the inspection is a non-intrusive visual check of accessible components such as distribution boards, sockets, cables, cords and light fittings. At its most thorough, it could comprise the following:

- An appraisal of the job, featuring:
  - Job-specific risk assessment
  - Survey and testing of the installation’s earthing, continuity, insulation, polarity, layout and accessibility arrangements
  - Enquiries to determine the degree to which parts of the system can be isolated
  - Review of available documentation
- Visual check of all accessible components
- Labelling, i.e. unique identification of circuits
- Functional tests to check whether all the relevant components do what they are supposed to do
- Thermographic testing to quickly detect hidden defects as ‘hot-spots’ in the system
- Clear reporting – publishing circuit diagrams, all test results and a summary of any defects with actions recommended to make safe.
A suite of test methods and required outcomes are specified in detail in the British Standard BS 7671: 2008, often referred to as the IEE Wiring Regulations. In fact, the requirements of this standard are not regulations in the legal sense.

**The frequency and scope of your in-service fixed wiring inspections should always be determined by an assessment of the risks.**

BS 7671: 2008 does provide guidance on both frequency and scope of inspection for low voltage installations (less than 1,000V a.c. or 1,500V d.c.), based on criteria like the type of premises: e.g. ‘Three-yearly for a factory and five-yearly for offices.’

**Note:** this British Standard does not cover the public electricity supply, electricity on vehicles, nor fixed wiring in quarries, mines and other hazardous areas (where there is an explosion risk).

**The law**

The law says that all employers must safeguard the health and safety of all people affected by their undertaking and, in the UK, it is a criminal offence to fail in this duty of care.

Fundamentally, employers are required to assess the risks associated with their business and manage those risks at a tolerably low level. More specifically, employers are required to comply with applicable regulations; often a large number of them.

For fixed wiring, the specific regulations are the Electricity at Work Regulations, 1989 (EAW). The HSE has issued a very useful document, which is freely available to download from their website, entitled ‘Memorandum of Guidance on the Electricity at Work Regulations, 1989.’

You will note that this guidance is non-prescriptive, in keeping with the goal-setting format of the regulations, which means that maintenance is a statutory requirement, but the scope and frequency of maintenance and inspection should be risk-based: i.e. suitable and sufficient.

In spelling-out the requirements of the EAW regulations, the HSE guidance makes it clear that fixed wiring shall be maintained so as to prevent danger (so far as is reasonably practicable) and that regular in-service inspection is an ‘essential’ part of preventative maintenance.

For prescription, you can turn to the British Standard mentioned above (BS 7671: 2008). Remember: This British Standard is comprised of non-statutory regulations.

**Repairs and conflict of interest**

Regarding repairs, the in-service inspection contractor may be prohibited from undertaking repairs. For example, Zurich Engineering is a Type A Inspection Body, as defined in the international standard ISO 17020, accredited by UKAS.

Zurich Engineering are entirely independent of all activities that might affect the integrity of the inspection – including maintenance and repairs – which prevents a conflict of interest from arising.

**The risks and benefits**

A few mA of electrical current can be fatal and the mains voltage (230V a.c.) should always be considered potentially fatal.

The principal hazard associated with fixed wiring is electric shock. However, other hazards should be considered, including burns, arcing (which can damage the eyes) and ignition – setting fires or creating explosions if flammable/explosive materials are present.

What is at stake, of course, is the health and safety of people and significant financial and business losses. So the benefits are clear: control the risk to control the cost.
How to approach fixed wiring in-service electrical inspection

A balance always has to be struck between inspection and maintenance. Too little inspection/repair, and the risk will be too great; too much inspection/repair and the cost will be too great.

Of course, the more preventative your maintenance, the lower the reliance on in-service inspection and repair to control risks in the first place. You will need to strike a balance between inspection and maintenance (repair) activities that you are comfortable with.

Another important consideration is whether you use the same inspectors for maintenance or perform maintenance independently. You will also need to choose whether to subcontract or go in-house, the depth and frequency of the inspection (and maintenance); and the degree of detail in the inspection reports.

You may simply wish to add electrical inspection to whatever in-service inspection arrangements you have for other items, such as your lifting equipment.

Deciding on the depth and frequency of inspection, and the detail of reports, may be more difficult. The decision needs to be based on a potentially complex interaction between inspection activities, maintenance activities, production requirements, and stakeholder expectations.

In our view: if you are not already doing so, you should make use of risk-based inspection (RBI) techniques to determine the approach that you take for the in-service inspection and maintenance of your fixed wiring.

You should not be too daunted by the thought of applying RBI. The rigour applied to the RBI assessment should be commensurate with the scale of the electrical risk at your premises and it might not take too much effort to complete.

Generally, the benefits of RBI outweigh the cost. RBI delivers a specification for an inspection and maintenance regime that is suitable and sufficient and optimises the risk-control-per-unit cost.

Summary

- Your electrical plant, appliances and fixed wiring should be inspected routinely
- The law is goal-setting and requires the inspection (and maintenance) regime to be suitable and sufficient: i.e. risk-based
- Use of risk-based inspection (RBI) techniques is recommended to determine the scope and frequency of inspection and the optimisation of costs

For more information

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