

## Electrical Fires – Fixed Electrical Installations

### Understanding the Risk

Fixed electrical installations are present in all types of occupancies, such as offices, shops, factories, warehouses and schools.

A typical fixed electrical installation comprises the main electrical switchgear, electricity transformers, electrical distribution boards, electrical control panels and all the associated fixed electric wiring and equipment, including lighting circuits.

In addition to causing serious personal injury, which is sometimes fatal faults involving fixed electrical installations often result in either fires and / or costly production downtime. As a result, installations should follow industry standards and also undergo ongoing inspection and maintenance.

### Managing the Risk

Proper Installation is Critical

It is essential that the electrical installation be adequately designed, constructed, inspected, and tested in accordance with recognized codes, such as The National Fire Protection Association's (NFPA) Standard 70, *The National Electrical Code*, to prevent electrical faults and operational disruption.

System design and installation should be performed by qualified and licensed individuals. Selection of equipment and wiring needs to be compatible with the surrounding environment and planned usage. For example, electrical wiring, and equipment used in wet locations need to be liquid-tight when directly exposed to water. In a flammable atmosphere, it must not cause an ignition of the atmosphere which could produce a fire / explosion. Electrical wiring and equipment should be certified by a recognized testing laboratory such as Underwriters Laboratories (UL) for its reliability, safety, and suitability for use in the area intended.

The installation should also be inspected and approved by applicable regulatory agencies. All aspects of the design and installation need to be addressed to help assure safe and reliable operation as intended.

### Inspection Testing and Maintenance

In addition to inspection and testing of newly installed or modified electrical installations, ongoing inspection and maintenance is needed to identify and mitigate any deterioration which could either impair safety or increase the risk of a fire. Deterioration can occur as result of a number of factors:

- Electrical overloading
- Aging

- Damage
- Wear and tear
- Corrosion
- Environmental causes

Establishment of an electrical maintenance program should follow recognized industry best practices such as NFPA's Standard 70B, *Recommended Practice of Electrical Equipment*, and be conducted by qualified individuals or contractors.

Key electrical maintenance elements should include:

- Planned shutdown of equipment to minimize operational disruptions and unsafe energized maintenance activities
- Incorporation of equipment manufacturer's recommended maintenance practices
- Testing of circuit breakers and other protective equipment
- Cleaning and tightening of electrical connections
- Testing of wiring insulation and grounding
- Lubrication of moving electrical equipment such as motors

### Thermography and Ultrasonic Testing

In addition to the periodic inspection and testing, the maintenance of fixed electrical installations can also be significantly enhanced by either thermographic surveys and / or ultrasonic testing.

Thermographic imaging surveys identify electrical system hotspots associated with loose or dirty connections, defective insulation, or improper torque etc.

Ultrasonic testing complements thermographic surveys, particularly where the doors and covers to parts of a live fixed electrical installation cannot be removed, to enable the required thermal imaging to take place.

Both thermographic imaging surveys and ultrasonic testing should be conducted by qualified individuals with written reports provided to aid in the prompt remediation of findings.

Through proper risk awareness, selection, installation, testing, and maintenance, the safe operation of fixed electrical systems can help ensure a well protected facility.

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