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## Electrical Wiring and Testing

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### The Legal Position

All places of worship are covered by the Electricity at Work Regulations 1989. They state that any installation that complies with the IEE Wiring Regulations, BS7671, will be deemed to comply with the Electricity at Work Regulations.

### Issues

The first issue must be safety, prevention of injury to people whether clergy, staff, congregation or visitors. They must be protected from electric shock and from the dangers of fires ignited by electrical related faults. Of course there is also the question of protection of sensitive historic fabric from the ravages of fire, whether it is total destruction or smoke damage.

There is a requirement in the IEE Wiring Regulations, BS7671, to protect cables and equipment from mechanical damage. This is because mechanical damage can result in a fault which, in turn, could lead to either electrical shock or fire. Not all mechanical damage is obvious to visual inspection, for example internal damage to a cable is very difficult to detect until a sizable fault develops.

All electrical work should always be undertaken by qualified electricians who are members of NICEIC (*The National Inspection Council for Electrical Installation Contracting*) with 'Approved Contractor' status or ECA (*The Electrical Contractors Association*). Amateur wiring, even on a temporary basis is to be discouraged and may invalidate your insurance.

Electrical wiring installation and alteration may require authorisation by faculty, so you are advised to consult with the DAC Secretary at the earliest opportunity.

### Choice of Wiring System

The wiring system needs to be aesthetically sympathetic with the building. Each case must be considered on its merits, but the systems of wiring which may be permitted are as follows:

- Mineral Insulated Copper Sheathed (MICS), or FP200 Gold cables, with the PVC sheath coloured to match its background where visible (Mineral Insulated Copper Clad – MICC - cables, exposing bare copper, are susceptible to corrosion in damp places), or
- PVC/PVC cables *provided* they are protected from physical abrasion or rodent attack by steel or rigid heavy-gauge high-impact plastic conduit or trunking and this conduit or trunking can be installed without physical or visual damage to the building.
- For outdoor underground wiring, use Steel Wire Armoured PVC sheathed (or served) (PVC/SWA/PVC).

FP200 and its equivalents do not have the same high level of physical damage protection as MICS, nor are they as flexible. One of the major draw backs of FP200 etc is the very large bending radius. And FP200 etc are just as easy for amateur amendments to the circuits as PVC/PVC. MICS is capable of running at higher core temperatures due to its construction, but that can also be seen as a negative as the higher temperatures means that it could possibly ignite any adjacent combustible surface. FP200 Gold does have physical damage protection, but need more frequent fixing than MICS cables.

Please note that it is only the sounder circuits for fire alarms or the power supply for emergency lighting from central batteries that require any form of fire survivability, as invariably buildings are re-wired after a fire.

### Builders Work in Connection

- (a) Holes or chases must not be made in or through buttresses, piers, mullions, columns, detached shafts or vaulted ribs.

- (b) No holes may be drilled in, or fittings fixed on, any bosses – whether stone or wood – unless they have already been drilled for a previous installation.
- (c) Beams, structural timbers or mouldings are not to be drilled, notched or sawn on any surface.
- (d) No chases shall be made in brickwork, masonry or plaster without the prior consent of the architect.
- (e) Wiring must not be laid over the surface of any carvings or paintings nor, if any other line is available, may be laid over the face of mouldings.
- (f) Where woodwork – e.g. pews or panels – must be pierced, the smallest hole to give reasonable clearance for conduit or cable should be drilled carefully, and in the least conspicuous position, so as to avoid splitting out or mutilation.
- (g) All plugs in walls for conduits, switches, fuse boards, saddles, etc., shall be as small as practicable having regard to the duty they are intended to perform. If the condition of the masonry or plaster is such that any other fixing method appears necessary, the architect shall be consulted.
- (h) For exterior work lead plugs and brass screws shall be employed. For interior work all fittings must be able to resist deterioration in damp conditions.
- (i) Wherever practicable the electrical contractor shall be required to submit drawings for the approval of the architect or other responsible person showing proposed routes of all cables. Where this is not practicable the routes of all cables should be clearly described in writing and approved before work is started.

### **Distribution Board**

This houses one of the key safety features, the fuse or circuit breaker. Cartridge fuses are brilliant because they can clear very large fault currents safely and cannot operate again. On the other hand circuit breakers are expected to work safely again after they have cleared large faults, such as short circuits. The selection of circuit breakers must take into account the prospective short circuit current in the church. Churches should be encouraged to install Residual Current Circuit Breakers, RCCB's, as additional protection against electric shock.

### **Testing**

The quinquennial inspection system requires that all electrical installations are inspected every five years by a competent electrical engineer in accordance with IEE Regulations, Guidance Note No. 3. The date of the last test should be recorded in the quinquennial inspection report and the inspection certificate should be filed in the church log book.

The **switchgear** in the church should be labelled to show the date of the most recent inspection and the date of the recommended future inspection.

**Lightning conductors** should be tested at fixed intervals. Once every 2½ years should be adequate for most churches. The date of the last test should be recorded in the quinquennial inspection report and the inspection certificate should be filed in the church log book.

You should also carry out a thorough physical examination of all **portable appliances** regularly, especially items such as cleaners, for faults such as damaged cables and plug tops. Portable electrical appliances should also be tested regularly by a competent person, (*who should be a member of NICIEC, ECA or NAPIT – the National Association of Professional Inspectors and Testers*) covering the whole appliance, i.e. plug top, cable and appliance itself. The frequency depends on the level of use and risk of damage, ranging from one to five years. A record of the inspection and testing should be filed in the church log book. Details can be found in the IEE Guidance on Portable Appliance Testing.

### **Additional information and advice is available from the DAC team:**

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