

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. These are basic guidelines intended for trustees to make available to specifiers and electrical contractors to help in the preparation of tenders, specifications and proposals for new electrical installations, alterations, routine maintenance or minor works to churches.

Contractors

Only registered approved members of NICEIC, ECA, or NAPIT should be employed to carry out new installations, alterations, maintenance, and minor works. Only the highest standard of workmanship should be allowed. Operatives should be skilled tradesmen, who are aware of the community, historic and architectural importance of our buildings. They should be particularly made aware of any uses that are outside the 'norm' for a church. Such uses would include, and this is not an exhaustive list, any overnight accommodation, use as schools, especially those that cater for pre-school children, any water based activities and use by the elderly, especially those suffering dementia.

Existing Electrical Installations

The electrical installation should be fully tested and inspected every five years in accordance with BS7671 (IEE regulations guidance Note No 3) by a registered NICEIC, ECA or NAPIT contractor. The inspection certificate/report should be held in the church log book.

Code 1 defects (definition - 'adversely affects the safety level of the installation') arising from the inspection, **MUST RECEIVE IMMEDIATE ATTENTION.**

Code 2 defects (definition - 'requires improvement') should be attended to as soon as possible.

Installations over five years old should also be subject to annual routine checks.

New Installation Works

1. General

New installations or alterations require a project through the consents website and the relevant approvals. Minor maintenance or replacement work may be permitted under CPD 930. All work must be carried out in accordance with BS7671 (IEE regulations latest edition including amendments). It is advisable for the church architect to be involved at an early stage, so that any installation undertaken involves minimal disturbance of the fabric of the building and is aesthetically appropriate. Any work on a listed building or building in a conservation area will require consent and advice should be taken at an early stage from the Conservation Officer based in Manchester.

2. Lighting Installation

A lighting system should be designed to provide:

2.1 Sufficient general lighting to enable users of the building to read and follow the Service, as well as move about without health and safety risks.

2.2 Feature lighting to enhance the architecture.

2.3 Good flexibility of control to match the activity or mood to the visual environment. It is also essential, when planning an installation, to consider the prospective use of the building, the possible wider community use, and to have efficiency, maintenance, and energy conservation firmly in mind:

2.4 Discharge lamps (metal halide or high pressure sodium) are highly energy efficient and reliable over long periods of time. They provide an excellent spread of light, therefore suitable for providing general illumination, from fewer fittings compared to any other lighting source.

2.5 Halogen based lamps are available in a variety of types which can be used for many different applications, and would be suitable for spot lighting, or providing contrasting emphasis.

2.6 LED (light emitting diodes) lamp technology has progressed, making this very compact, durable, lighting source suitable for discreet feature lighting, with extremely low energy consumption.

2.7 The secret of a good lighting system is to be able to control it. Dimmer control can have dramatic effect and save energy. Not all discharge lighting can be dimmer controlled, it is therefore essential to have good flexibility of switching with no more than two lamp units per switch. Consideration should also be given to the 'glare factor' and attachment louvers are available for most light fittings.

2.8 Lighting for a concert or stage area can be successfully achieved by including suitably rated power points, for the use of portable stage lighting rigs.

2.9 Ideally light fittings should be positioned to allow easy access for lamp changing. This is not always possible. However, with the present long life span of lamps (particularly discharge lamps) it would be advantageous to plan ahead and budget for a complete periodic lamp change, carried out professionally, without health and safety risks.

3. Emergency Lighting

There is currently no statutory requirement for churches to provide emergency lighting. It is however, the duty of the trustees to carry out a risk assessment, as required under the Health and Safety Regulations. NB: This is not the case for church halls that are available for public hire.

3.1 If the assessment results in a decision to provide emergency lighting, it should be installed in accordance with BS5266.

3.2 An emergency lighting log book, with the record of regular testing must be kept up to date. Without regular testing and maintenance, emergency lighting will soon become ineffective.

3.3 The emergency light fittings should be non-maintained units (i.e. to activate only on power failure). For aesthetic reasons it would be preferable to incorporate the emergency unit within a general lighting fitting if possible.

3.4 If infrequent provision only, is required, illuminated exit signs and emergency lighting can be provided by portable 'plug in' units, with the provision of a discreet socket and bracket in the appropriate positions. When not in use the emergency lighting units could be kept energised, adjacent to the electricity mains supply position. This would also help to ensure that the lighting units are in working order prior to use.

4. External Floodlighting

There are many things to consider before deciding to floodlight the exterior of the church:

4.1 Light pollution, particularly in rural churches.

4.2 The Wildlife and Countryside Act (1981) - English Nature.

4.3 Archaeological advice in respect of sunken lamps and cable routes, especially through burial grounds.

4.4 Energy consumption - use of low energy fittings - time control to prevent unnecessary illumination.

4.5 Choice of appropriate lamp colour rendering, for the particular stonework.

4.6 If the building is listed or in a conservation area.

4.7 If the floodlighting would increase the security of the building, or, conversely, cause attraction from those with a less than Christian intent. Consideration may be given to external PIR motion sensor switches, especially on roofs and climbing points.

5. Electrical Heating

Space heating a church, other than a very small church, by electricity, would not be recommended. The sustained input of heat, required to overcome the heat losses of the building, and raise the temperature to an acceptable level, using electricity, would be substantial, and even if affordable, it would be an extravagant use of energy.

The choice of a new heating system will vary according to the circumstances. If the circuit is contemplating a wider use of the church, keeping the building constantly warm would be an obvious advantage. Hot water heating systems would be more suited to this. In many churches it is a matter of providing warmth for a small congregation in a large building, for a few services each month, at an affordable running cost. This means putting heat where the people are, rather than attempting to heat the whole space. Electrical heating can be used efficiently to achieve this objective.

5.1 Under pew heating

If it is possible for under pew heating to be successfully accommodated, it can be an effective and economical method of providing heat where it is required. The heaters are low level 'skirting type' convector units. They are unobtrusive, and the wiring to them can usually be concealed within the pew platforms. These heaters are available in various lengths (output from 500 -750 watts per metre) with integral overheat thermal safety cutout protection, and can be linked together if necessary. The heaters should be floor mounted on brackets, NOT fixed to pews, and assurance should be obtained from the manufacturer that the heaters used in this type of application conform to current Health and Safety Regulations. Good flexible switching is advisable, ideally a switch concealed under each pew, with contactor/time control at the distribution board to enable the system to be energised for a short pre-heat period prior to the services, and also prevent the heaters from being left on unnecessarily. If considering such heaters, thought needs to be given to whether there will still be room for kneeling, without any risk to the congregation.

5.2 Off/peak fan assisted storage heating

This can be used to provide a low level background temperature in small churches, provided there is space, and they are able to be located relatively unobtrusively. This heating could be used to supplement under pew heating, and would also benefit the fabric.

5.3 Radiant / quartz heating

It is generally accepted that quartz heaters are not pleasing in appearance. They also produce a bright light, which can be visually intrusive. These should only be considered where there is no feasible alternative.

6. Wiring systems.

The following, are the types of wiring considered to be acceptable for use in church buildings:

6.1 MICV (mineral insulated copper covered with polymeric sheath). This is a very durable cable which is available with LSF (low smoke and fume) sheath which comes in various colours to blend with the surrounding surfaces. The

brass termination glands are the compression type and come complete with shrouds to match the sheath colour. This cable should be fixed with wrap around clips (colour to match the cable sheath) and screws.

6.2 FP200 (fire resistant cable). This type of cable was first used for fire alarm installations. It is now considered a quality cable suited to many applications. It also has LSF (low smoke and fume) covering. Like MICV cable it retains its shape (good for dressing around stonework). The TRS termination glands prevent the ingress of dampness and also come complete with shrouds. The added advantage of this cable is the economy of installation costs, being far less labour intensive to install than mineral insulated cable. This cable should be fixed with wrap around clips and screws. FP200 cable comes with white or red covering. However it can be successfully painted to blend with the surrounding surfaces. The paint used must be approved by the cable manufacturers.

6.3 MICC (mineral insulated copper covered). This cable is the same as MICV cable without a sheath covering over the copper. If this cable is used on damp surfaces, particularly with lime based mortar, it will quickly discolour and corrode. This cable should be fixed with wrap-around copper clips and brass screws.

6.4 Steel Conduit (with PVC cables). Steel conduit has been used in many churches in the past and can be re-used for rewiring an installation if found to be in good order with no signs of corrosion. If conduits are re-used the conduit should not be used as a CPC (circuit protective conductor). A separate earth conductor should be used throughout. Where existing conduit is re-used, it does prevent disturbing the fabric. However it is highly unlikely that steel conduit would be considered for a new installation, because of the higher labour cost and the aesthetic impact.

6.5 High Impact Plastic Conduit (with PVC cables). This conduit is much more economical to install. There are applications where this could be preferred, such as towers and boiler rooms.

6.6 SWA cable (steel wire armoured). This cable should be used for all external buried cable runs. It is also ideal for sub-mains, under floors or in ducts. Where this cable is used, the wire sheath should not be relied on as the CPC (circuit protection conductor), allowance should be made for a separate earth conductor core.

7. The Fabric

Cable runs should be carefully planned so that they are unobtrusive and do not cause damage or disturb the fabric. Vertical cable runs should be kept to the corners or cross sections, and horizontal runs should be at wall plate level or at low level. Cable fixings should be drilled into the mortar joints (not stonework) wherever possible, and should be appropriately spaced in order that the cables lie flat on the surface. Trunking should only be used for multiples of three or more cables, in which case it should be painted to blend with the surrounding surface. No chasing of plaster, drilling through walls or exposed timber should be carried out without prior approval through the consent's system.

8. Sockets and Portable appliances.

Sockets should be the metal clad type and should be protected by a 30ma RCD. Sockets in wet situations, such as bell chambers, should be at least IP54 rated. All portable appliances should be tested by a competent person in accordance with the Health and Safety regulations, and a log of regular tests for each appliance be provided.

9. Organs.

The organ can be a risk area. The electric blower motor is often overlooked and can be tucked away gathering dust. It should be examined at regular intervals to prevent it becoming a fire risk, particularly if left inadvertently turned on after use. Consider having an indicator light on the organ control switch.

10. Lightning.

There is no way to predict or prevent lightning strikes. A single bolt of lightning can contain up to one billion volts of electricity which can cause considerable structural damage if the bolt strikes a building. Lightning damage comes in two forms:

- Structural damage to the fabric of the church, which is usually minor but can result in fires or falling masonry.
- Indirect damage to electrical systems and equipment.

The resultant voltage surge can cause malfunctions and shutdowns and burn out wiring. Telephones, computers, electric organs and alarm systems are all at risk. Approximately 60% of insurance claims for lightning damage are for electrical wiring and equipment rather than structural damage.

Recent estimates suggest that around 80% of churches have some form of lightning protection installed. Perhaps counter-intuitively, churches with lightning conductors are actually more likely to be struck, but the energy is directed harmlessly away from the building and into the ground. Churches without protection are five times more likely to suffer structural damage as the result of a strike.

The traditional defence for most churches has been a lightning conductor, a single Franklin rod leading from the top of the spire or tower to an earth stake in the ground. A modern approach to protection would be a Faraday Cage system, a mesh of conductors laid at intervals over the roof and down the walls of the church, and connected to the ground by earth electrodes.

Methodist Insurance offers this advice on lightning:

- The Church Shield policy provides protection against damage caused by lightning
- While Methodist Insurance does not insist that your church has lightning protection in order to insure it, they do advise having one fitted if a risk assessment indicates one is required
- Lightning conductors need to be maintained properly if they are to be effective. They need to be inspected at least every four years, although the recommend period is every two-and-a-half years
- If your church has one of the older lightning protection systems, it does not need to be upgraded unless a risk assessment concludes that an upgrade is necessary
- You can prevent electrical equipment being damaged by power surges by installing surge protection equipment
- Any work on a church's lightning protection system should be conducted by a competent contractor such as a member of ATLAS (Association of Technical Lightning and Access Specialists)

A record of the visual checks and inspections should be held in the church log book.

11. Surge protection

Surge protection should be considered as part of the risk assessment particularly with the increase in the use of electronic equipment in churches, e.g. sound systems, organ controls, computers, projectors, dimmers etc.

Surge protection can be included within the mains distribution gear

12. Record keeping

Drawings, in plan and elevation, with clear photographs showing the exact positions of all new fittings. Photos should show where fittings are to be located within the context of the church as a whole.

12.1 Details of cable routes.

12.2 Illustrations of proposed light fittings, heaters, etc. (from catalogue etc.)

Trustees are advised to obtain two or three quotations to ensure they are getting value for money. Only the quotation from the chosen contractor need be submitted to the DAC. If more than one quotation is submitted to the DAC then it should be stated clearly which the preferred quote is.

13. Certification

The following certificates appropriate to the works carried out should be provided with originals held in the church log book:

13.1 New electrical installation work - NICEIC Electrical installation certificate (EIC)

13.2 Minor electrical works - NICEIC Minor works certificate (MEW)

13.3 Periodical Inspection - NICEIC Periodic inspection report (PIR)

13.4 Portable appliance testing - HSE log test sheet

13.5 Emergency lighting testing - NICEIC BS5266 log test sheet (ELT)

13.6 Lightning conductor testing - BS6651 log test sheet