

DIOCESE OF BATH AND WELLS

HEATING OUR CHURCHES: A SHORT GUIDE

INTRODUCTION

This paper has been produced to assist those who care for their respective churches and seek information on how to manage the efficient provision, or maintenance of, heating within the ecclesiastical environments over which they exercise stewardship.

The PCC of every church will at some time have had to wrestle with varied aspects of how to replace, upgrade or repair the systems that provide creature comfort for their congregations and background care for the fabric and contents of the building e.g. organs, books and textiles during the winter months. It must be remembered that any heating system will have architectural as well as aesthetic, and perhaps archaeological, implications.

It is no easy task to arrive at the optimum way forward but this paper, the **CCC pamphlet "Heating your Church"** and professional advice from the Diocesan Advisory Committee (the DAC) will help to achieve a successful solution.

SECTION I: SEEKING ADVICE

New and modified heating installations must be designed to comply with DAC criteria and current best practice. The appointed Church Architect or Surveyor (hereafter referred to as the church architect) should always be involved at an early stage.

The first step to take if you are seeking any advice concerning the heating of your church is to contact the DAC. They will arrange for a specialist in that particular field to come and assist you with the decision making process. You will receive unbiased advice given by a person with considerable experience, who will be able to balance your heating needs against other factors such as compliance with statutory requirements and maintenance of the aesthetic value of your church. The DAC advisor will also, on request, in conjunction with your church architect, produce a detailed report to assist you in your subsequent deliberations and is available to evaluate estimated cost for works provided by contractors, in order to facilitate selection of the most suitable proposal for the required works.

The church architect in conjunction with the DAC Heating Advisor can explain to the PCC the options involved in carrying a heating project forward. It may be prudent to use the services of a consultant rather than a contractor in order to obtain an unbiased opinion. The church architect should advise the PCC about conforming to Health and Safety requirements, CDM regulations and consultation with heritage bodies.

SECTION II: TYPES OF HEATING SYSTEM

The types of heating system currently available for use in church buildings are:-

1. **WET SYSTEMS** these circulate hot water from a heating source to various

types of heat emitter within the church

- 1.1. **Boilers** the heating source (normally a boiler) can be oil fired, gas fired or electric. If oil boilers are used the oil storage tank must be contained in a "bund" (oil proof wall) or be double skinned. Access, location and visual impact must also be considered. The route of the oil filler line and oil feed may have archaeological implications (especially if underground routes are decided upon). The boiler position should be selected with care, bearing in mind noise generation, weatherproofing and flue considerations. Similar considerations need to given to gas fired boilers as regards gas main routing and meter positioning. Electrically heated boilers are rare in churches but such boilers are manufactured and if an adequate electrical supply is available and water quality is managed to required levels they could be utilised.

Gas boilers are very efficient and building regulations now require that they should be of the "condensing" type. Condensing boilers need to work at a lower temperature to achieve a high efficiency and as a result radiators or other heat emitters may need to be larger. Correct selection of this type of boiler is critical, as combustion chambers can rapidly corrode.

- 1.2. **Piping** From the boiler selected distribution piping is installed to feed the heat emitters. The piping will be in black iron or copper. It is important to note that where heating pipes do not provide useful heating to the church, they should be insulated with approved materials. The piping **should not penetrate** important architectural features or items of church furniture and it must be aesthetically acceptable
- 1.3. **Feed and expansion** In some churches wet systems are fed with open top feed and expansion tanks which have to be filled manually. This is far from satisfactory and where possible feed and expansion tanks should be fed with mains cold water through a ball-valve. Even more preferable is the selection of a "sealed system" incorporating the necessary ancillary components to protect the installation from pressure damage. This latter type of system has the advantage of reducing corrosion within piping and heat emitters.

Where there is no mains water supply to the church and the heating feed tank is filled manually the water **must not** be taken from a rainwater butt.

- 1.4. **Circulating pumps** The circulating "pump" is the heart of the system and should be positioned with care to prevent damage from damp or external corrosion. Consideration is sometimes given to selecting a "duty/standby" option. A circulating pump is intended to deliver the correct volume of water against the resistance of the index circuit.
- 1.5. **Heat Emitters** Heat emitters are many and varied and need to be selected with care in order to blend in with the environment. Radiators can be either of steel or cast iron, complete with isolating valves on flow and return. Existing cast iron radiators should be valued as long term available sources of heat provision and should not automatically be considered for scrapping during heating modifications, just because of their age. When motorised fan

convectors are being considered, noise generation due to the operation of the fan and air movement can be an important factor. Such convectors need regular maintenance and cleaning.

2. **ALL AIR SYSTEMS** The selection of systems that use heated air, transported into the building via ductwork and grilles needs careful thought particularly in relation to accommodation of ductwork, noise and heat stress to the building fabric due to rapid heating and cooling. Air systems designed to provide air at low velocity but at the same time slightly pressurise the building will only work effectively if the structure is well sealed (particularly the roof) otherwise heated air will escape at high level to the atmosphere and desirable temperatures at pew level will not be achieved.
3. **ELECTRIC HEATING** In a church environment this can be by means of under pew tubular heaters, quartz-ray heaters, standard infra-red heaters or convectors of either natural or fan convector variety. Whatever type of system is selected it is important to ascertain the implications of adequate power provision which can be extremely expensive. Under pew heaters should include adequate guarding and ancient oak pews will not marry well with this type of system. Quartz-ray units will only be considered an option if they do not "clutter" the architecture. Occasionally "night store" heaters are found in churches: these are extremely inefficient and are not recommended for churches.

Under pew tubular heaters give off very little heat for each metre of their length and so may have to be supplemented by alternative types of emitter. An alternative is to use under pew convectors. Either option should not be used where pews are not in fixed positions.

Off peak tariffs used by storage heaters reduce running costs and may be the only option where no other fuel or water (for a wet system) is available.

4. **DIRECT GAS FIRED HEATING** This is not be encouraged in a church because of the potential damage to fabric due to combustion products and the visual damage caused by the extent of the equipment.
 - 4.1 **Liquid propane gas** If this is considered as a fuel source then recognition must be given to the stringent requirements associated with its storage and use. LPG is expensive a fuel as electricity and a large storage tank will be needed which must be accessible and visually acceptable.
 - 4.2 **Controls** Detailed consideration must be given to the selection of the most suitable automatic controls. Some of these are very sophisticated and it is important to have a system which is suited to the use / uses of the building.
 - 4.3. **Running costs** The DAC is able through its advisors to give realistic information as to comparative running costs for various types of heating system using different fuels.

SECTION III: QUALITY

The stewardship we embrace in maintaining a place of worship is a great responsibility and quality is required in all we do in order to protect the fabric of the churches we care for. This means that heating installations must be installed that comply in every respect with agreed levels of workmanship and with statutory regulations e.g.

1. Gas installations must be carried out by fitters holding a current certificate of competence and be Gas Safe registered
2. Electrical installations must be by companies whose work is subject to inspection by National Inspection Council representatives
3. Projects taking more than 30 days to complete must comply with Construction (Design and Management) Regulations 1994 (commonly known as CDM regulations.)

SECTION IV: ENERGY CONSERVATION AND ENVIRONMENTAL ISSUES

It is always a good idea for the PCC to carry out a survey of the church with a view to noting areas where measures could be employed to reduce heat loss e.g. replacing broken or missing window glass and sealing (or fitting curtains across) ill fitting doors. However it should be noted that a modicum of ventilation is required in order to prevent condensation and the onset of damp. Where possible energy saving initiatives should be considered , including appropriate insulation.

Global warming and climate change have an impact on heating design. Churches may wish to consider heating solutions which use sustainable energy sources but these will have considerable financial and aesthetic implications.

SECTION V: MAINTENANCE

Any type of heating system that has been installed requires regular maintenance and adequate provision must be made for this.

SECTION VI: HELP REQUIRED

The DAC is there to help and should you require a visit from a specialist advisor to give preliminary informal advice before applying for a faculty then contact:-

Mrs Sarah Davis, Assistant DAC Secretary, Diocesan Registry, 14 Market Place, Wells BA5 2RE (Tel. 01749 674747) email: sarah.davis@harris-harris.co.uk

The DAC advisor is then available to answer any further queries which you may have.

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