Wakefield
Diocesan Advisory Committee

Guidelines for the installation of sound systems in churches

Introduction

Sound systems in churches should be thought of as sound reinforcement rather than Public Address systems. Usually volume is not required, whereas clarity of sound is. A typical system is comprised of four main components: loudspeakers, amplifier/mixer, microphones and a loop.

Loudspeakers

In the early days of sound systems in churches a very popular loudspeaker was the 'line column' type. This consisted of a narrow, tall box containing a number of loudspeakers arranged in a column. This unit gave good speech intelligibility but did not reproduce music well. As many churches started to use groups or instruments during a service this type of loudspeaker fell from favour.

These days loudspeakers are used that are normally seen in theatres, cinemas or lecture halls. This type of loudspeaker gives good reproduction of speech and music. They are also quite efficient, requiring only low to medium power amplifiers to drive them. The cabinet sizes of modern loudspeakers need not be large, an important fact when trying to minimise the visual impact of an installation.

Loudspeakers may be positioned in a church to give directional sound or distributed sound. Loudspeakers fitted at the front of the church will give directional sound, i.e. the sound is coming from the same direction as the preacher. This gives the congregation a point of focus. The disadvantage of this set-up is that the loudspeakers are usually easily seen. Also, in large churches, the sound level may fall off towards the back of the church.

The advantage of directional sound is lost if the preacher moves about the church during the service (with a radio microphone) or if part of the service is conducted from other areas of the church. With this in mind the distributed sound system is the favoured system in churches.

The distributed sound system uses loudspeakers fixed to the sidewalls of the nave or to pillars. This allows the sound to be distributed along the length of the church, usually at a lower volume that when front mounted loudspeakers are used. Although the sound does not arrive at the listener from the same direction as the preacher, this system works well when different parts of the church are used during a service.

Small additional loudspeakers are sometimes fitted for the choir and any ante-rooms where people may wish to listen to the service. These loudspeakers are usually lower power versions of the main speakers and are sometimes fitted with individual volume controls.

It is important to reduce the visual impact of loudspeakers. If loudspeakers are fitted at high level the case should be a dark colour to blend in with the roof beams. Wall fitted speakers should be painted to match the décor, or should be of a colour that blends in. Cables should also be camouflaged. If they cannot be chased into the walls they should be surface fixed (clips, mini-trunking or glue) and painted.

A 'sphere' type of loudspeaker could also supply distributed sound. This type of loudspeaker is suspended from the ceiling or roof beams of the church. The loudspeaker itself is fitted inside a spherical housing and the sound issues from the sphere upwards towards the roof. A reflector above the sphere bounces the sound down towards the congregation. The sound coverage is extremely even and usually fewer loudspeakers are required than if fitted to the walls of the church. The writer only knows of one church in the diocese fitted with this type of speaker and that is St Peter's, at Horbury.

Amplifier / mixer

Most of the main types of amplifiers used in churches are equipped with inputs for at least four microphones and a CD or cassette player, so for most installations a separate mixer is not required. The microphone inputs on the amplifier are designed to accept fixed microphones of various types and also radio microphones.

Individual volume controls will enable the sound level from each input to be pre-set, or adjusted during the service. An overall level control will set the volume to the loudspeakers. A 'non-loudspeaker' output ('Line' output) should also be available to connect to a loop amplifier or any other external equipment (such as a cassette player to record the service).

For churches that include a musical group or additional performers in their service a mixer console will be required. All the microphones and instruments are connected to the mixer, the output of which is taken to the main amplifier. Each channel on the mixer will have individual controls to adjust the level and quality of the sound from the microphone or instrument connected to it. As the mixer will be operated during the service it is essential that it be positioned so that the operator has good sight of the 'acting area'.

Microphones

Microphones may be fixed or radio types.

Fixed microphones are usually used for the pulpit and lectern, where a small discreet capsule microphone or portable microphone is fixed to a floor stand. Alternatively, the microphones may be secured directly to the pulpit or lectern, but would then require anti-vibration mounts to minimise any movement noise from the reader.

A 'boundary effect' fixed microphone is sometimes used for the altar table. This type of microphone is placed on the surface of the table and has a very low profile, so is not easily seen.

At least one radio microphone should be included in any church installation. A radio microphone system consists of a transmitter and a receiver. The transmitter (about the size of a packet of cigarettes) is carried by the preacher whose voice is received by a small lapel microphone connected to the transmitter. The signals from the transmitter are picked up by an aerial and receiver, which are usually positioned near the main amplifier. The receiver is connected to an input of the amplifier.

The receiver should be of the 'diversity' type. This type uses two aerials, the idea being that if the signal from the transmitter to one aerial fades due to an obstruction, there is a good chance that the second aerial will pick up the signal at full strength.

Deaf-aid loop

Any new sound installation must always include a loop system for people with hearing aids. The loop itself is usually one or two runs of cable positioned around the body of the church and sometimes around the choir. The loop may be installed at high level, skirting board level or sometimes underground, along heating pipe ducts. Any person sitting within the loop, and a short way outside it, will pick up the signal on a hearing aid (when switched to the "T" setting). The loop is driven from a dedicated amplifier, which is fed from the main amplifier. Anything heard through the main speakers in the church will also be carried by the loop. The amplifier feeding the loop will be set-up to give a comfortable listening level with minimum distortion.

General

In a sound installation thought should be given to where the amplifier is to be sited. If it is to be located in the open area of the church, in a disused pew, for example, consideration should be given to supplying a lockable cabinet or rack. This may be difficult if a mixer is part of the installation, as this item is usually quite large. For the majority of installations the amplifier will probably be positioned in the vestry, where it will be secure.

Wherever the amplifier and any auxiliary equipment are positioned, they will require power. Sound system installers don't usually install power. This has to be supplied by the church.

A helpful article about sound systems is available in the 'A to Z of Church Maintenance' section of www.churchcare.co.uk.