

DISPLAY CASES IN CHURCH BUILDINGS

Introduction

Architects and conservators are the first point of contact for projects involving the installation of display cases in a place of worship. These guidelines assist the professionals dealing with the care of church buildings and their collections.

It can take several months to design and construct a new case, and cost will be another key consideration. To help you achieve the best possible display solution for objects at risk, your project should allow sufficient time and resources for all parties involved – architects, conservators, churchwarden/cathedral administrators, DAC Secretaries and FACs – to discuss all of the key points highlighted in this document.

Displaying objects in the context of a church building

Church buildings hold a wide range of objects, many of them unique portable artworks of great significance that may require special protection and display.

Display cases are often found in museum exhibitions and are a well-proven solution for the display of portable objects. However, the devotional character of places of worship means that the use of a display case will need to balance the long-term protection of objects (or the setting up temporary exhibitions) against the special function and character of historic church buildings.

When to use display cases

Significance and risks are the initial considerations when deciding if a protected display is necessary; not all portable objects in churches must or should be displayed in cases. Case design can be difficult and costly, and cases will have significant maintenance requirements, so it is important to be sure that a case really is the best way of dealing with the challenge of preserving the object. Justifications include:

- **Accessibility**
 - Improving the visibility of historic objects for the benefit of visitors and congregations
- **Physical protection**
 - ◆ Protection from damage associated with bat colonies
 - ◆ Protection from theft or vandalism
 - ◆ Protection from touch or accidental damage when other alternative protections (e.g. rope or glass barriers) are not effective

- **Environmental protection**

- ◆ Protection from atmospheric pollutants
- ◆ Protection from poor environmental conditions (in particular fluctuating relative humidity)

If the intention is protection from poor environmental conditions (often encountered in church buildings), it is important to be sure that everything possible has been done to put the building into good condition, and to deal with sources of moisture.

If there are no outstanding issues with the fabric or the water disposal systems, the next step is to consider any environmental controls within the building, such as the heating, which may be causing damaging fluctuations of temperature and humidity.

If all possible improvements have been made but the environmental conditions remain poor, then a protective case may well offer the best chance for the long-term preservation of objects at risk.

It may sometimes be possible to reuse an existing display case, but it must first be assessed to ensure that it is not likely to cause harm to the object that it will contain: even if a case has successfully preserved one type of object for many years, it may not be suitable for another object of a different type. A case that is actively contributing towards the deterioration of the objects displayed within it should normally be replaced, although where the case is of particular interest adaptation may sometimes be possible.

The significance of the case must be balanced with the need to protect the object, so it is important to seek professional advice.

Types of display cases

Once the need for a display case has been agreed, the extent and type of control must be established, as this will determine the specification requirements. These can be grouped into:

- **Passive control:** the desired environmental conditions are provided by the buffering properties of the case and/or a buffering material within it (such as silica gel)
- **Active control:** powered air-conditioning units provide the desired environmental conditions
- **Hybrid controls:** a mixture of passive and active controls.

The more complex the controls on a display case, the more expensive and difficult to maintain it will be.

Designing a display case

Developing a specification for a display case is a joint initiative that should involve:

- the church's inspecting architect, to ensure an appropriate installation
- a specialist conservator, to assess the condition of the object, analyse the risks of deterioration and advise on optimum display conditions
- the Churchwarden/Cathedral Administrator, to ensure that they are trained to provide adequate maintenance and access to the display case
- a display case designer, to ensure an adequate construction (you can find details of specialist designers by contacting local or national museums and galleries; ask to see examples of previous display work, particularly in churches and historic properties)
- the DAC Secretary/Cathedrals Fabric Commission to advise on necessary permissions.
- the building's insurer

Key considerations

Understanding the object and the risks to its deterioration is key to ensure that the display case will provide suitable protection. A conservator will be able to provide this initial assessment.

Construction materials

The use of compatible construction materials is essential to ensure the long-term protection of the displayed object.

All materials should be tested for stability and compatibility with the exhibits.

The following table summaries the suitability for display cases of a range of different materials.

MATERIALS FOR CASE FRAMES		
MATERIALS	RISKS	COMMENTS
Wood	All types of wood (including oak, birch and beech) will release volatile organic acids, which will attack metal, paper and calcium-based objects. Aged wood may emit less acid than fresh wood.	If wood is used, the display area must be protected by sealing it from the wooden components using special vapour barriers (see below).
MDF and plywood	These are engineered wood product that emit high quantities of organic acids. They should not be used for display cases.	A zero-formaldehyde MDF with much lower emission rates is available and is widely used for cases, but the display area should be protected with special vapour barriers (see below).
Glass	Considered a safe material for display cases, but it must have adequate protection against breakage: anti-bandit laminated glass meeting BS5544 standard should be used.	Low iron-content glass is also recommended, as this will reduce the green tinge.
Acrylic or polycarbonate sheets	Acrylics are not recommended for display cases where the control of relative humidity is a concern, as they are permeable to water vapour. Polycarbonate is considered a safe material for display cases.	If using acrylics (where the control of relative humidity is not a concern), attention must be given to possible heat gain, which is higher in acrylic display cases than it is in glass.
Steel and other metal alloys	Widely used in the construction of display case frames, but may be prone to condensation in humid environments. Steel is often powder coated, but some finishes may emit low levels of volatile acids.	Cases should be monitored against condensation. Painted finishes should be tested beforehand to ensure they do not off-gas.

MATERIALS FOR LININGS AND DISPLAY MOUNTS

MATERIALS	RISKS	COMMENTS
Textiles	<p>Traditionally used to line the interior of display cases and mounts, but it is essential that they are stable: some fabrics can become acidic in contact with wood, emitting sulphurous gases which can be harmful (particularly for metallic objects).</p> <p>Well-tested inert fabrics (i.e. free from copper, silver and lead compounds) should be used.</p> <p>Green wool baize is inappropriate as it contains sulphur; velvet is also not recommended.</p>	<p>If you wish to use new (untested) fabrics you should first carry out an accelerated corrosion test to investigate its suitability: further information about this type of testing, developed at the British Museum, can be obtained online.</p>
Clear acrylic, mirrors and glass	Recommended for mounts	<p>Always make sure mounts are well secured to the case, as many churches have uneven floors.</p>

Vapour barriers

If a display case is being built with materials known to emit volatile compounds, or an old display case (particularly an old oak case) is being refurbished, a vapour barrier should be applied to separate the material from the display area. These can reduce the level of emissions coming into contact with the object, but they will not eliminate them; the result will be adequate for many displays, but if the object is highly sensitive or significant it is better to use alternative materials. The most popular vapour barriers are plastic laminated aluminium films (polyethylene, aluminium foil, nylon or polypropylene), available commercially from specialist suppliers. Acrylic varnishes can also be used.

Ventilation and air exchange

It is extremely difficult to make display cases that are completely airtight; in general it will be necessary to aim for an acceptable level of air exchange between the case and the room, which will depend on the level of protection the object requires. If a case is needed only for security or display, and the environmental conditions in the church building are stable, then air exchange is not a key concern, and indeed ventilation holes are encouraged to reduce the risk of condensation inside the case. If, however, the object requires protection from fluctuating environmental conditions, or the humidity levels inside the church building are very high, then the air exchange must be kept to a minimum, so the case will need to be sealed.

Doors and joints should be sealed with conservation-grade materials such as neutral-cure silicone or polyurethane. It is important to remember that seals will age and need regular replacement; easy replacement should be built into the design. The air exchange rate will need to be tested to confirm the effectiveness of any seals, and once the display is in place, the conditions inside the case will need to be monitored to ensure the case is continuing to operate correctly.

Environmental controls

Control of relative humidity

A key driver for the use of display cases in churches is to protect fragile objects from very high relative humidity, or humidity that fluctuates significantly. If improvements to the fabric and the heating or other control systems are not sufficient to provide stable conditions suitable for important objects, then a sealed and controlled display case is an excellent alternative. The need for a controlled case will need to be based on a careful investigation of the mechanisms of deterioration of the object, and the internal environment of the church building, so expert advice should be sought.

Passive control

Silica gel, conditioned to maintain the desired relative humidity, can be placed in the display case, usually in concealed drawers. The design must allow for good air exchange between the display area and the gel store. The gel must be removed and reconditioned regularly, so the design must allow for this.

This system can be very effective so long as the quantity of gel is sufficient: up to 20kg of gel will be needed for each cubic metre of display space.

The maintenance regime will need to cover regular replacement and reconditioning of the gel.

Active control

A powered conditioning system usually incorporates a dehumidifier, heating unit and a fan. Active control increases the cost and complexity of construction, and the maintenance requirements. A power source will be needed, and any leads protected from accidental damage or vandalism.

Control of pollutants

The control of pollutants in display cases needs to be justified on the basis of a careful investigation of the object's deterioration; again, expert advice should be sought.

To neutralise any corrosive sulphide gases that may build up in a display case, activated carbon or copper particles bonded with a polymer can be used. Some objects themselves give off gases that may be harmful to others, so care should be taken when placing mixed collections into a single display case.

Security

Locks and hinges should be concealed within the case frame ([BS EN 16893:2018](#) provides guidance on suitable types of locks). For objects where security is a particular concern, an alarm system can also be incorporated. Security arrangements should also be discussed with the building's insurer.

Lighting

The lighting system must be chosen not only to ensure a good display of the object, but also to control levels of ultraviolet and infrared light and temperature. External light sources should be avoided, as they can cause heat to build up inside the display case. Low light levels and low energy consumption are always to be preferred, with LEDs desirable.

Access

Access requirements are a prime design consideration: it must be easy to undertake cleaning and day-to-day maintenance (e.g. replacement of lamps or silica gel) without endangering the object, and the object must be accessible for conservation assessment when necessary.

Installation

The installation of a display case must be closely supervised by the church's Inspecting Architect, who will have an in-depth knowledge of the building.

Location

Ideally, display cases should be placed in areas of stable temperature (away from external doors, or heating units). Ideally, cases – especially wall-mounted cases – should be kept away from the external walls of the building, which will be the most prone to moisture problems.

Make sure that there will be no direct sunlight into the case at any time of year: not only would this endanger light-sensitive objects, but it will also lead to temperature building up inside the case.

Checks prior to installation

For free-standing cases, the floor loading in the chosen location will need to be assessed.

If the case is to be wall mounted, the chosen location should be checked to ensure there is no danger of damaging any important parts of the fabric (for example, wall paintings concealed under later plaster or paint).

Mounting

When mounting a display case on or near a wall, an air gap will need to be kept between the case and wall (a minimum of 5cm is recommended), together with an layer of some insulating material such as aluminium-coated board (this is particularly when mounting onto external walls).

The fixing mechanism must be able to prevent the case being levered off the wall. Stainless-steel fixing brackets, or security screws with their heads filled are recommended.

Maintenance

To ensure that the display case is fulfilling its objective of protecting an object, a programme of inspection and ongoing maintenance needs to be in place. The Churchwarden /Cathedral Administrator will be central to guaranteeing the long-term effectiveness of the display case, and it is important that they are kept informed about access arrangements to the case and its maintenance requirements. All relevant documents should be accessible to ensure that those new to the post are fully briefed.

If display cases include monitoring equipment (for ongoing monitoring of relative humidity, temperature or light levels, for example) this will need to be calibrated regularly. A conservator will be able to assist with this.

Cleaning

Many cleaning products release volatile compounds that can affect objects on display, or even damage the display case itself (particularly the seals). Advice should be sought from the manufacturer of the display case on the safest methods to keep it clean.

