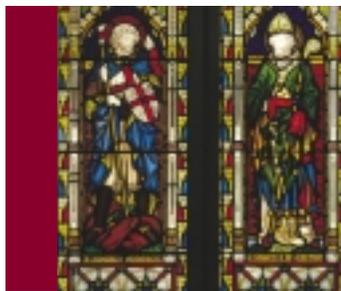


Section Three The protection of stained glass against damage

The lower panels of windows are a favourite route of entry for burglars. Motiveless vandalism and determined burglary are different problems. It has to be accepted that this kind of damage can only be deterred, not prevented, by any of the standard types of window guards.



The damaged window was re-made using a combination of restoration and reconstruction. All windows in this church had previously been photographed.

Any protection of stained-glass windows is subject to planning permission, and the local authority should always be consulted prior to any decision being taken.

The function of guards It is important to distinguish between the wish to protect windows against casual vandalism, with which this section deals, and the wish to prevent deliberate criminal entry. This latter topic is not covered by the present booklet. It is a mistake to assume that window-guards will prevent burglary although they may have some deterrent effect.

The advice given here is based on practical experience over twenty-five years and on discussions with architects, stonemasons, stained-glass studios, insurance companies, conservation bodies and Diocesan Advisory Committees in England.

A balance has to be struck between (a) the desire to protect windows in the best available way, (b) regard for the architectural aesthetics and (c) respect for the fabric of the building.

Before investing in guards, it should be established whether it would be feasible not to have any guards at all. The only real solution to the problem of vandalism is to attempt to re-educate those responsible. There are certainly rewarding cases where vandalism has been successfully eliminated by the quality of usage of the church building throughout the week and by creating a well-established role for the building within the community. There is some evidence to support the theory that attempts at providing security can actually be counter-productive.

Galvanized ferrous metal wire guards Wire-guards provide a good method of protecting windows, without compromising the architecture. Two rules apply if the guards are to be visually acceptable. (a) They must be shaped to fit to each lancet and tracery-light. (b) The silver/grey colour of the galvanizing process is inappropriate for a church and they should be given a black finish. The principal drawback of galvanized wire-guards is that, unless they are

regularly maintained, they will eventually rust and this can cause serious, possibly irreversible staining to or spalling of stonework. Cases are known where rust has penetrated up to 30mm into the stone.

Those opposed to wire-guards will argue that they do not give protection against someone armed either with an air-gun or with a hammer in one hand and a spike in the other. But, statistically these kinds of incidents are rare, most damage being caused by stone-throwing or by deliberate attempts to break in. The other objection often cited is that the guards can be visible from the inside, looking out and it has to be said that they can be seen through leaded-lights and lightly-painted stained-glass windows.

We often feel that the problems we face in society today are new and we imagine a golden era when these problems did not exist. This certainly is not true in the case of crime in general and vandalism in particular. The large stained glass studios routinely fitted wire-guards when they installed new windows in their thousands in the second half of the nineteenth century. So this simple, obvious approach to protecting stained-glass windows is very well established and in most cases, is remarkably effective. In a sense then, if the problem of rust-staining can be overcome, there is no need to look further for solutions.

Copper wire-guards The points made above apply equally to copper guards. The only difference is that the staining will be green rather than red.

Stainless steel wire-guards A completely effective answer to the problem of rusting and staining is to be found in the use of stainless-steel, rather than ferrous, wire-mesh. Two grades of metal are commonly in use. Grade AISI 304 is adequate for most applications but the more expensive grade AISI 316 is to be recommended for buildings in coastal locations or in heavily-polluted industrial areas.

If the risk of rust staining is to be eliminated, it is essential that not only the wire-mesh, but also the clips and the screws are of stainless steel.

These massive, industrial guards are doubtless effective, but they are quite unsuitable for this historic cathedral. The materials are too heavy and, by fitting mesh across the whole of the lancets and tracery, the appearance of this elegant Decorated Gothic window has been ruined. A balance has to be struck between protecting the glass and respecting the architecture.



Vandalism is not a new problem. Nineteenth-century windows were routinely fitted with wire guards and they did an excellent job of protecting the stained glass for several decades. However, the guards here were fitted in the 1860s and should have been renewed long ago. They have now caused unsightly, and probably irreversible, rust damage to the stonework.

The most suitable type of window guard is that made of welded stainless-steel wire-mesh, secured with stainless-steel clips and screws and grey nylon wall-plugs. The black finish here is a polyester powder-coating.



The windows at this church are fitted with stainless-steel wire-guards, but they are scarcely discernible and the visual integrity of the building has been preserved. Secondary glazing was removed prior to the fixing of the guards.

Apart from eliminating rusting, a second clear advantage over galvanized wire is provided by the fact that stainless-steel wire has a greater integral strength. Moreover the welded mesh, characteristic of stainless-steel guards, is more rigid than the woven mesh, characteristic of galvanized guards. It has been found that welded wire-mesh made of wire of diameter only 2.5mm (12-gauge) has the required strength and this makes for relatively fine guards causing minimal visual obstruction. A typical specification is for a welded 12-gauge wire mesh of 75mm x 12mm spacing and with 6mm diameter rods for the perimeter.

The technique known as powder-coating gives a pleasing matt black finish which has a real visual advantage. As elements in an architectural whole, stained glass windows externally have an overall dark and non-reflective character. Experience has shown that, when fitted with black-finished guards this appearance remains remarkably unaltered. The guards virtually 'disappear' and the character of the building is scarcely affected. This is in marked contrast to the use of plain sheets of glass or plastics as will be discussed below. For unpainted guards, the natural finish of stainless steel will in time, lose its shine, acquire patination and a similar result will be achieved.

Examples of black-finished stainless-steel wire-guards can be seen at the Church of Ireland churches at Abbeyleix, Co. Laois and Myshall, Co. Carlow.

Secondary glazing with polycarbonate, perspex or glass The protection of stained glass with sheets of polycarbonate, perspex or glass is to be discouraged. Indeed, in most cases it is completely unacceptable.

Both perspex and glass can be dismissed immediately since they are themselves breakable; so do not satisfy the prime requirement of protecting the stained glass against damage. Their use should always be avoided. There may be a few exceptional cases where the use of polycarbonate can be considered, provided that the design conforms to certain strict requirements. One such case is where an engraved window is to be protected, since the essential character of such a

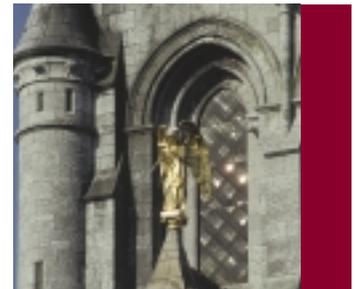
window would be destroyed by the use of wire- mesh. However the first principle applies here as with all guards and this is to establish whether a guard is really needed at all: is there a high risk of vandalism?

If polycarbonate is used, its function as a shield against damage must not be confused with that of trying to provide double-glazing for thermal reasons. Frames should not be used and the sheets should not be sealed into the wall, as this produces harmful, unventilated cavities. Such cavities are damaging both to the stained glass and to the stone and they encourage organic growth. Polycarbonate must never be fitted in large sheets, covering stonework as well as stained glass but must be cut to the shape of the glazing, with all stonework exposed. There should be gaps between plastic and stone to allow for a free flow of air and to accommodate expansion and contraction. The fixings, which should be of stainless steel (not aluminium), should also be designed to allow for movement. To avoid distortion, sheets should be of 6mm thickness.

There remain serious drawbacks to the use of polycarbonate shields even if correctly designed and fitted:

- (a) The reflections give the building an unpleasant 'blind' look and any distortion in the sheet leads to an ugly 'hall-of-mirrors' effect.
- (b) The polycarbonate sheet can be deliberately scratched, disfigured with graffiti or destroyed with petrol.
- (c) The outer surface of the stained glass (and the inner surface of the polycarbonate) cannot be easily cleaned.
- (d) Unlike wire guards, the long-term properties of polycarbonate shields are not known. They may possibly last for twenty years. Discolouration is very likely. To spend money on polycarbonate will not be as sound an investment as spending a similar sum on stainless-steel wire guards, which are likely to put in a century of service.

The outer appearance of leaded-light windows and stained-glass windows is an important element in the architectural whole, providing texture and balance. These tower windows have never been guarded and have remained undamaged since 1880.



When windows are covered in plain sheets of glass or plastic, there are large plain reflective areas and the integrity of the building is seriously degraded.



Some of the drawbacks of secondary glazing are graphically illustrated in this pair of pictures which show the inside and outside of the same window. The broken glazing can be seen on the outside but is also clearly visible from the inside, appearing as cracks across the heads of the figures. Similarly the unpleasant piles of insect eggs can be seen not only outside but also inside, as shadows. There is fungal growth in the cavity between the two layers of glazing and the secondary glass is stained with rust.

The removal of secondary glazing Whilst secondary glazing should ideally be removed there is a classic circular dilemma here. The presence of the secondary glazing could well have contributed to the deterioration of the leaded glazing which may no longer be weatherproof. So, without the secondary glazing the window might leak. In that sense, the leaded glazing has become dependent on the very thing which is harming it! The only way to establish this will be to take a cautious approach. First, a small test area of the exterior secondary glazing should be removed and a water test carried out. If there is no leakage then the secondary glazing can come off. If there is leakage then it has to be reluctantly accepted that the exterior secondary glazing will have to be retained until such time as the secondary re-leading can be done.

In order to avoid damage to the stained glass, the process of removal of the secondary glazing must be carried out with extreme care, using small tools. The technique employed must involve only forces applied parallel to the glass and must never be directed inwards towards the stained glass.

Isothermal glazing The system known as isothermal glazing, which is designed to protect historic glass against environmental damage - rather than vandalism - is complex, and not discussed in this booklet. In certain exceptional circumstances, isothermal glazing may be considered. Advice should be obtained from studios which have specialised in this technique.

The option of not guarding The policy of deliberately leaving windows unguarded is a sensitive issue, and each case must be taken on its merits. It may be more appropriate in some localities than others. For this approach to be effective, it must be accompanied by an untiring but rewarding campaign aimed at involving the community and the potential offenders. In our experience, most damage is caused by a very young age group. This area of activity, touching as it does on pastoral matters, is beyond the scope of the present paper. A church in good order, with a well cared-for exterior and surroundings is less likely to attract damage than one which looks run-down and neglected.

Conclusions Window guards can be effective against vandalism but will not in general prevent a determined burglar. Isothermal glazing, which can be considered in rare circumstances, is not designed as a protection against vandalism.

No design of guard is perfect

Our order of preference is:

- 1) No guards at all
- 2) Powder-coated stainless-steel wire guards
- 3) Natural-finished stainless-steel wire-guards
- 4) In exceptional cases only, correctly-designed polycarbonate guards

The Architectural Heritage Protection Guidelines state that:

“New external protection may be required to protect historic or interesting glass from breakage or from damage by the elements. Where this is the case, this protection should be provided in a way which is reversible and as unobtrusive as possible. The protection should not be made or fixed in a way that will damage the fabric or appearance of the structure or window. For example, the rusting of metal grilles or run-off from copper or iron fixings could cause damage to the fabric. Another example of bad practice is the creation of unventilated cavities behind external secondary glazing panels that encourage excessive and damaging heat build-up or allow condensation to occur on the face of the historic glass. In this case, the applicant should indicate how the historic glass is to be ventilated.”

The appearance and character of the building will be harmed by the use of plastic sheeting that can surface-craze or become opaque through exposure to the elements. This sheeting is also highly flammable and its use should not be permitted near valuable glass where the exterior is accessible to vandals. The appearance of the external protection will be enhanced by requiring it to be formed to fit the shape of the opening and any tracery while allowing for sufficient ventilation.”

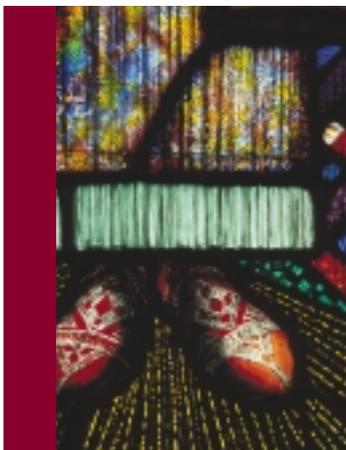
Amongst the many disadvantages of secondary glazing is the simple fact that it is breakable. Here a stone has broken both the secondary glazing and the stained glass.



Thin polycarbonate sheeting has been used here, giving hideous “hall-of-mirrors” distortions. This can be overcome by using 6mm thick sheet, but the reflections, whilst not being distorted, will still give the building a “blind” appearance.

Section Four Making a photographic record

Stained glass of 1920 by Michael Healy of Dublin at St. Mary's Church, Castlecomer, Co. Kilkenny.



The need for stained glass to be recorded The Heritage Council strongly recommends that it is in the interest of all concerned for a photographic record to be made of the unique stock of stained-glass windows in Ireland.

This can greatly assist in the study and appreciation of these important works of art, especially if coupled with a list of the artists, studios and dates and some background information.

Another important use to which a photographic record can be put is to assist with the repair of damaged windows. By the very nature of the material of which it is made, a stained-glass window is particularly vulnerable. Whilst having a vital architectural function, it is also a valuable and unique work of art. Experience has shown that faithful repairs to windows following damage can be carried out more effectively if photographs of the windows exist. In the case of churches, a photographic and historic record is of interest, not only to the members of the church, but also to visitors, possibly through the production of an illustrated guidebook. Good quality images can also be used for educational purposes and to form the basis of postcards or greetings cards.

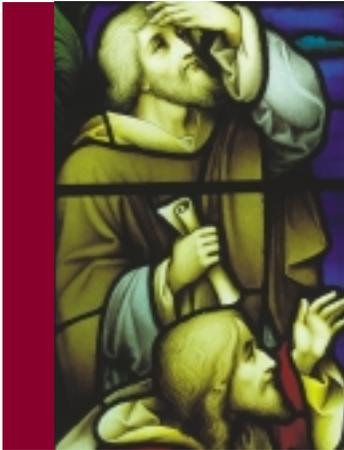
The Church of Ireland is making a comprehensive photographic and historic record of all the stained glass in its churches in the Republic. Ideally, for churches of other denominations and for other buildings, a photographer experienced in recording stained glass should carry out this work, but the following paragraphs contain advice for those wishing to take the photographs themselves.

Floor-plan of building Before taking the photographs, a simple floor-plan of the building should be drawn, indicating the position of each window. For a church, the sanctuary east window is numbered as W1. Then W2, W3, etc. are those proceeding in a clockwise direction through south, west and north windows.

Right: Stained glass of 1938 by Edward Burne-Jones, made by Morris & Co. of London at Mulrankin Church, Bridgetown, Co. Wexford



Stained glass of 1901 by John Bishop Earley of Dublin at Drumcondra Church, Dublin.



Film Transparency (slide) film makes for the best record and is preferable to negative (print) film. The colour and detail are superior and, if a print is needed for a particular purpose, this can now be made very effectively direct from the transparency. The best definition is obtained by using a slow film, preferably ISO 25 or 50 and no higher than ISO 100.

Lens A long focal length lens, rather than a wide-angle lens reduces perspective distortion. A good quality 100-300 zoom is ideal for most purposes. The camera is best set up at a good distance from the window.

Tripod The camera should be set on a tripod, the taller the better, and a cable release or delayed-action function used.

Digital photography Digital cameras can be useful but the cheaper models have limited definition. Even the best models available do not have the definition equivalent to an ISO 50 slide film. The digital camera should be set to record the maximum file-size, even at the expense of storing fewer pictures. A spare memory card expands the capacity. The digital camera needs a lens with a good range of focal lengths to match the performance of a conventional camera with a 100-300mm lens. Digital images of sufficiently high resolution can be used to produce good-quality prints and slides.

Weather and lighting The ideal weather conditions are bright but overcast. In any case, the day or time of day should be chosen so that there is not direct sunlight. The lights must be turned off and no flash or photographic lighting used.

Framing Both overall shots and close-up details are useful. For large windows, it is not wise to record the whole window in one frame.

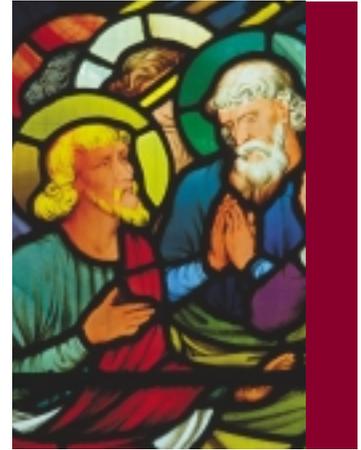
Focus The most common problem seen in photographs of stained glass is poor focus, possibly due to having to deal with transmitted light in a relatively dark environment. Careful use of automatic focus is of great help here.

Assessing the correct exposure The brightness range of many stained-glass windows is greater than the range recordable on colour film, although slide films (particularly from certain manufacturers) have a greater range than print films. If first-rate results are wanted, the choice of exposure is critical. This is a complex matter and cannot be dealt with in any detail here. The best results are obtained by using a specially-calibrated hand-held spotmeter in conjunction with the Ansel Adams Zone System. If the meter within the camera is to be used, the exposure which it proposes is seldom the one to use, although it does provide some guidance. As a broad principle, darker windows should have a shorter exposure, brighter windows should longer exposure, than the camera meter suggests. Where there is doubt, several alternative exposures can be used: this is known as bracketing.

Processing of films Having carried out the photography, the film should be sent promptly, by Registered Post or courier, to the film-manufacturer's processing laboratory or to a professional colour laboratory. Details of these can be found in the classified section of the telephone directory. For prints, if the laboratory is told that the subject-matter is stained glass, they can adjust the exposure so that the highlights (e.g. the faces) do not burn out.

Labelling Each slide, or each print must be labelled with the name of the building and the window number and possibly the date.

Number of copies - and storage It is sensible to make at least two complete sets and to store them at different locations. The best and cheapest way to obtain two copies of a colour slide is to press the shutter twice, rather than to have duplicates made. For longest life, prints and slides should be kept in a dry, cool, dark place. Digital images should be 'backed-up' on CD, but will require regular upgrading, as there is not yet a reliable long-term digital storage method.



Stained glass of 1876 by William Burges, made by Saunders & Co. of London at St. Fin Barre's Cathedral, Cork.

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THE AUSTRALIA ICOMOS CHARTER FOR THE CONSERVATION OF PLACES OF CULTURAL SIGNIFICANCE (THE BURRA CHARTER);

International Council of Monuments and Sites (ICOMOS), 1999 (first published 1979 and revised 1981, 1988 and 1999)

LIST OF STAINED GLASS WINDOWS GRANT-AIDED BY THE HERITAGE COUNCIL:

St. Peter's College, *Wexford - Rose Window*
St. Michael's Church, *Abbeyleix, Co. Laois*
Mariners Church, *Dun Laoghaire, Co. Dublin*
St. Lachtain's Church, *Freshford, Co. Kilkenny*
Sligo Cathedral, *Co. Sligo*
Lissadell Church, *Co. Sligo*
Adelaide Memorial Church, *Myshall, Co. Carlow*

Back Cover: Stained glass of 1907 by Beatrice Elvery of Dublin at St. Ann's Church, Dublin



*Stained glass of 1914 by various
An Tur Gloine artists at All Saints'
Church, Grangegorman, Dublin*



*Stained glass of 1909 by
Cox & Buckley of Youghal at
a parish church, in Co. Laois*



*Stained glass of 1860 by Clayton
& Bell of London at St. John the
Evangelist's Church, Ardamine,
Co. Wexford.*



the care of STAINED GLASS

Ireland has a rich legacy of stained glass. Fine examples of the art can be found in public and private buildings across the country, but mainly in our churches. The work of some of the finest European, English and Irish artists graces great cathedrals, historic buildings and humble churches.

This booklet is intended as a guide for the custodians of these treasures, to assist them in their care and conservation.

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