

# CONSERVATION

## Windows in Historic Buildings



*St Edmundsbury*  
BOROUGH COUNCIL

# WINDOWS IN HISTORIC BUILDINGS

## Introduction

This leaflet has been produced to guide owners of historic properties when considering the repair or replacement of windows. Thousands of historically important windows are needlessly destroyed because owners believe they are beyond repair. They are frequently replaced with windows that do little to complement the character and historic appearance of the building and may even disfigure the very architectural quality that gave a property its special interest.

Many replacement windows manufactured in the last three or four decades used timber from inferior, cheaper, softwood species are already beyond repair - despite the use of chemical preservatives. In contrast, thousands of well maintained windows which date from the 18th and 19th centuries and made out of slow grown, high-quality, durable softwood timber, still survive.

A glossary is provided at the end of this leaflet to explain the terms used for describing windows and their components.

## The history of window development

The earliest domestic windows still surviving in any number are openings formed within the structure of a timber frame building with smaller vertical sections (mullions) set into the opening to provide security. Openings were covered with oiled cloth, paper or sliding or hinged shutters to keep out the wind and rain. Glass, although available since the 13th century, was not widely used until the 16th century. Many of these early mullion windows were subsequently filled in or expanded to provide larger



*Photo 1: a 16th century mullion window with square leaded-lights*

openings. Typically, the mullions were either modified to take glazing or were removed and a glazed softwood window inserted into the original timber framed opening (see photo 1).



*Photo 2: cruciform windows with diamond leaded-lights*



*Photo 3: lozenge-shaped leaded-lights*

By the 17th century fixed leaded-lights, set directly into a

window frame or in a side-hung, flat, wrought iron opening casement, became fashionable and were less the sole preserve of the very wealthy (see photos 2 and 3). Window design began to develop into a distinct architectural element illustrating style, social and economic standing, craft and technical advances.



*Photo 4: 16th century blocked mullion windows with inserted sash windows between. Note the different sizes and proportions of the windows*

The proportions of earlier windows were generally long and low with a horizontal emphasis. This began to change in the mid-17th century (see photo 4). Openings became taller and narrower, with cruciform windows used in many late 17th century buildings. Sash windows first appeared in England in the mid-17th century. They were of simple construction and consisted of a single horizontal sliding sash or a vertical sliding sash held up by pegs. The counterbalanced sash window with weights and pulleys came into use in the late 17th century. The oldest known surviving sash window, dated 1670, is located in Charles II's Newmarket house. Sash window design evolved to produce increasingly thin glazing bars and slender

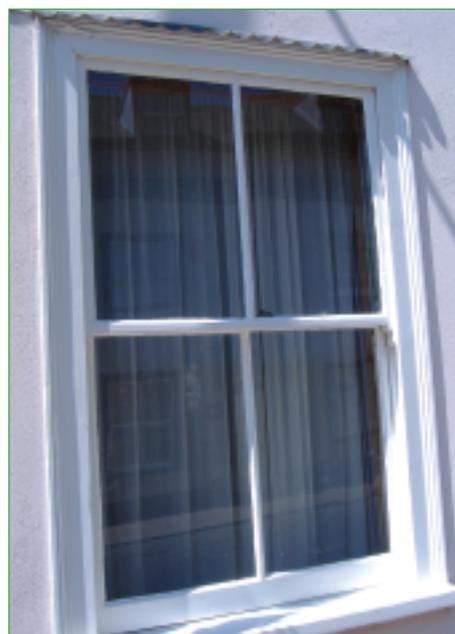
frames. The different profiles of glazing bars can be used to estimate the approximate age of a window.

Glazing patterns changed as less fragile glass was manufactured and by 1838 cheap glass was available in large, mass-produced panes. This allowed the number of panes per window to be reduced from as many as sixteen to eventually a single pane per sash. The reduction in the numbers of panes and glazing bars meant the window was less robust and so the vertical stiles (the pieces forming the sides) of the sashes were lengthened to increase the strength of the joints. These extensions, which became common on windows after 1838, are known as 'horns' and are often chamfered or moulded (see photos 5 and 6). In poorer homes and on the rear of buildings, where owners did not need to display their status, smaller windows using leaded-lights and wrought iron casements continued to be used.

By the late 18th century, cast iron started to be used and became more widespread with the introduction of malleable cast iron during the 1830's. This eventually gave way to wooden, side-hung casement windows in the late 19th century and they, in turn, were replaced in the latter half of the 20th century by mass-produced window frames made of softwood, aluminium, steel and plastic.



*Photo 5: small-paned sash window without horns*



*Photo 6: large-paned sash window with moulded horns on the top sash*

Many historic buildings have a variety of window sizes, materials and designs and these can reflect different periods or alterations and additions to the building. You should avoid the temptation to make all the windows the same as this means visible evidence of the changes the building has undergone will be lost. When you do change the windows, the new design must be in keeping with the age and architectural style of the property or part of the property in which they will be fitted. The borough council's conservation team can provide further detailed advice about changing windows in historic buildings.

## Repair or replacement

Regular maintenance is the most effective way of prolonging the life of historic windows. Many repairs are only necessary because of a lack of proper maintenance. Regularly painting the frame will prevent damp from penetrating into the wood and is a cheaper option than waiting until things are so bad that the preparation takes longer than the actual painting (see further reading for information on maintenance).

When window repairs are needed, the current trend tends to be for wholesale replacement rather than repair. It is a trend that owners of historic buildings should resist. Preservation, even of a single window, has aesthetic, cultural, social, environmental and educational values. In the long term, each of these may be more important than the economic value, and it is very rare that a window cannot be repaired for less than replacement costs. The difficulty is often finding a joiner or builder who will carry out the work. Removing decayed timber, splicing, patching and gluing new sections of suitable wood will, if the repair is carried out to a high standard, last at least as long as a new window. Repairs that fail are usually a result of poor workmanship. There are a number of publications on window repair (see further reading), which set out in detail the various methods which can be used. If a joiner or builder is telling you a window cannot be repaired it is likely that they do not want to repair it or are unable to do so. You should find a joiner or builder who can.

The permanent repair of a window will almost always be less expensive than wholesale, like-for-like replacement. The short-term savings of buying a cheap, poor quality, off-the-shelf window will soon be outweighed by its short life span.

## Flush-fitting vs storm-proofed casement windows

Traditional casement windows are flush-fitting. This means that the window which opens sits within the frame when it is closed and is therefore in line (flush) with it. Modern casements tend to be storm-proofed, with the closed window overlapping the frame and sitting proud of it, giving quite a different appearance.

Despite the name, flush-fitting casements are no less weather-proof than the storm-proofed variety and should always be used on historic buildings. It is important to note that the fixed lights (those which do not open) in historic windows are set within a sub-frame like the opening lights, so that both panes of glass are the same size. In contrast, modern casements have the fixed light set directly within the outer frame so it is larger than the pane of glass in the opening light (see photos 7 and 8).



*Photo 7: flush-fitting casement. Note how the right-hand fixed light is the same size as the left-hand opening light*

### Glass

Old glass is becoming increasingly rare. The irregularities of hand-made glass and the depth and liveliness that form its character contrast with the flat, stark, dullness of modern sheet glass. Hand-made glass should always be retained and valued for its special character as few types of new glass are suitable for replacement in historic windows. Always re-glaze in putty to avoid the increase in the thickness of glazing bars when timber beading is used.



*Photo 8: storm-proofed casement. Note how the glazed area of the left-hand fixed light is larger than the right-hand opening light and how the opening light stands proud of the frame*

## Paints

Lead-based paints are by far the best paints to withstand weathering. They can still be used if your building is Grade I or II\* listed (with the appropriate licence) but are generally unavailable. A good alternative when old paint has been stripped back to the wood is linseed oil paint. Although more expensive, linseed oil paints will last several years longer than the commonly used alkyd based paints. But do not buy cheap paint. Buy the best - it lasts longer. It is bad practise to stain timber windows, whether they are old or new replacements.

Softwood windows in historic buildings were traditionally painted, but more importantly, staining - regardless of what it says on the tin - will not provide the necessary protection offered by paint. As for colours, white or off-white oil paint appears to have been the only finish for wood windows until the late 18th century, when green, black, grey and purple-brown were used against light-coloured stone or plaster facades. Changing the colour of windows can have a big effect on the character and appearance of an historic building and needs to be carefully considered.

**Historic buildings have many small, concealed cavities full of dry combustible materials. You should never use a blowtorch to strip paint off a window.**

## Draught-proofing and secondary glazing

‘Draught-proofing’ is the term given to the methods designed to reduce any draughts and noise let in through gaps in windows. It is the best and least intrusive way of improving the performance of an historic window. Several forms of draught-proofing systems are available, most of which are made up of a series of seals and brushes. Some are glued or pinned to the surface of the window, whereas others need a small slot to be cut. Good draught-proofing strips can be durable and can last between 10 and 20 years without compromising the appearance of the window so it is well worth exploring the options. Make sure the window frame is prepared and do not paint over the draught-proof strips. A number of companies offer a repair and draught-proofing service.

Secondary glazing can be considered as an alternative to double-glazing. Its installation should be reversible without causing damage to the historic fabric of the building. It can also be designed so the windows open easily. The disadvantage of most secondary glazing is that the opening is often permanently sealed for many months, which adds considerably to the build up of moisture in the building, creating the conditions for damp problems. Modern secondary glazing systems are available which are easily removable during the summer months. They are also very discreet and do not detract from the appearance of the window from the inside or out. The air gap between the window and secondary glazing means this method is the most effective at reducing noise.

Details of draught-proofing companies and secondary glazing systems are available from the borough council's conservation team.

## Double-glazing

Removing traditional windows in an historic building and replacing them with modern double-glazing is like replacing an 18th century Georgian dresser with a DIY flat pack cupboard. The importance of conserving traditional windows and their detailing cannot be stressed enough. Double-glazing does not significantly reduce the amount of heat lost in a historic building. To be really effective, the Buildings Research Establishment recommends a gap between the sheets of glass of 20mm. However the gap in many sealed units is as little as 6mm. The cost of installing double-glazing is so high that studies have shown that savings on fuel bills to cover the outlay will take at least 40-60 years to build up - longer than the life of many new windows. The sealed units themselves are only expected to last 10 years, after which seals can break down causing the glass to mist. Heavy curtains can be a better investment.

## uPVC & aluminium

Much has been written about uPVC and aluminium windows. They have been variously described as at the 'cutting edge of modern technology', or 'an abomination on the face of our historic heritage'. Will the replacement of traditional windows rob an historic building of part of its architectural special interest? Will these modern windows add or detract from the historic appearance of the building? The answers may be subjective but a simple comparison of houses in a Victorian terrace, where some owners have retained the original sash windows while others have replaced them with uPVC double-glazed units, will demonstrate very graphically how inappropriate new uPVC windows can appear (see photos 9 and 10). Even when manufacturers attempt to retain the overall glazing pattern,



*Photos 9 and 10: comparisons of sash windows and uPVC replacements. Note how the frames of the uPVC windows are larger and flatter, they open differently and do not have the same three-dimensional appearance of the historic windows*

the stuck-on glazing bars (or lack of them), the double reflection of the glass, the loss of mouldings and the change in section size appear very modern against the historic façade. Such windows are not considered acceptable for use in historic buildings, particularly those which are listed or protected by an Article 4 Direction.

Prolonging the life of a 19th century window made from sustainable materials like wood and glass makes a positive contribution to the environment. The contrast with a new factory-made uPVC or aluminium window is stark – these are non-sustainable products, manufactured and transported using high levels of non-renewable resources and energy, destined ultimately to end up in a landfill site.

## Listed buildings and conservation areas

You will need listed building consent to replace windows in a listed building, even if the work will be done on a like-for-like basis. It is an offence to replace windows in a listed building without consent. However, you do not need consent for repairs which use matching materials and details. In conservation areas, some unlisted properties are protected by Article 4 Directions. In these cases, planning permission is needed before the materials or appearance of the windows can be changed. You should consult the borough council's conservation team if you think a window is beyond repair and needs replacing. If an historic window is judged to be beyond reasonable repair, it is likely its replacement will need to be an exact replica of the original, copying glazing bar details, mouldings and design.

## Building regulations

Building regulations relating to improved energy efficiency state that they should be applied in a way which does not harm the special interest of an historic building. The building regulations make it clear that the special characteristics of an historic building must be recognised. You can improve the energy efficiency of your property where practical, provided this does not harm the character of the building.

New extensions to historic buildings and conversions of non-residential buildings into domestic use must meet the requirements of the building regulations. It is not necessary to slavishly copy the design of historic windows on new extensions. Simplified versions, omitting thick glazing bars, can be double-glazed or a new, modern glazing pattern may be appropriate.

Approval under the building regulations may be required for replacement windows and you should contact the building control section for further advice before proceeding with any work.

## Conclusion

The installation of double-glazed windows, whether timber, plastic or metal, is always damaging to the character and appearance of an historic building and, on a wider level, to our historic environment. The fact that old windows are allowed to decay for want of regular maintenance is economic folly given the cost of replacements and the short lifespan of many modern windows. Repair, maintenance, draught-proofing and heavy curtains are far better choices for historic buildings.

## Glossary

**Casement:** a frame enclosing part of the glazing of a window with hinges to open and shut it. A **casement window** is one where the opening lights are hung on hinges rather than being sliding sashes or pivot-hung. A **side-hung casement window** is one where the hinges are at the side and a **top-hung casement window** is one with hinges at the top. The latter tend to be used in modern windows with the arrangement of a small top-hung light with a side-hung light beneath.

**Light:** a compartment of a window (the space formed by mullions and transoms, or a pane of glass, for example). An **opening light** is one which opens and a **fixed light** is one which does not open.

**Frame:** the wooden or metal structure holding the opening and fixed lights. The lights themselves form the frame for the glass.

**Glazing bar:** a piece of wood or metal dividing a window into components for the glass. Different mouldings were used at different times so can help to establish the age of a window.

**Sash:** the frame which holds the glass for the window and which opens and closes by being raised and lowered in vertical grooves. A **single-hung sash** is one where only one sash moves. A **double-hung sash** is where both sashes move. The sashes are fitted in a **sash-frame** and suspended on cords (or chains if very heavy) and counterbalanced with lead or iron weights.

**Mullion:** a vertical pier which divides the lights of a window. Mullions are often moulded and the type of moulding can help to date the window.

**Transom:** a horizontal bar which divides a window into two or more lights.

**Moulding:** anything with a contour or detail to its section. Mouldings are used to decorate and add interest to the timberwork of windows. As different mouldings were fashionable at different times, they can help to date windows.

## Advice and Contact Details

For further advice about windows in historic properties please contact:

The Conservation Team  
Planning and Engineering Services  
St Edmundsbury Borough Council  
Western Way  
Bury St Edmunds  
IP33 3YS

Tel: (01284) 757356 or 757339

E mail: [conservation@stedsbcc.gov.uk](mailto:conservation@stedsbcc.gov.uk)

For advice regarding the building regulations please contact the building control team at the above address or telephone (01284) 757387 or 757379.

## Further reading

Framing Opinions (a series of leaflets) English Heritage 1994 and 1997

Pamela Cunningham, *Caring for Old Buildings* Donhead 2002

Hugh Lander, *The House Restorers Guide* David and Charles 1986

A Lawrence and D Wrightson, *A Stitch in Time* IHBC 2002

A Townsend and M Clarke, *Repair of Wood Windows* SPAB 1998

Ed M Wood, *Building Regulations and Historic buildings* English Heritage 2002

## Useful Websites

English Heritage [www.english-heritage.org.uk](http://www.english-heritage.org.uk)

(includes access to the National Monuments Record and the Images of England website)

Institute of Historic Building Conservation [www.ihbc.org.uk](http://www.ihbc.org.uk)

Building Conservation Directory [www.buildingconservation.com](http://www.buildingconservation.com)

HELM [www.helm.org.uk](http://www.helm.org.uk)

Ancient Monuments Society [www.ancientmonumentsociety.org.uk](http://www.ancientmonumentsociety.org.uk)

Council for British Archaeology [www.britarch.ac.uk](http://www.britarch.ac.uk)

Friends of Friendless Churches [www.friendsoffriendlesschurches.org.uk](http://www.friendsoffriendlesschurches.org.uk)

Society for the Protection of Ancient Buildings [www.spab.org.uk](http://www.spab.org.uk)

Victorian Society [www.victorian-society.org.uk](http://www.victorian-society.org.uk)

Twentieth Century Society [www.c20society.org.uk](http://www.c20society.org.uk)

Georgian Group [www.georgiangroup.org.uk](http://www.georgiangroup.org.uk)

