Case study: draught proofing traditional sash windows

This magnificent Grade II listed house in a village near Bath has never been easy to heat. The many mullioned sash windows have always been a particular problem.

In 2010 the owners embarked on a comprehensive renovation and draught-stripping programme. Each window was, in turn, removed, renovated by a professional joiner and fully draught-proofed before being re-fitted. Although the job took some time, the results has been worth the wait: a much more comfortable and noticeably quieter interior.

Even the most well-made and well-preserved Victorian sash windows lose a lot of heat through draughts, especially at weak points such as the junction of the two sashes. Draught-strip closes all these gaps.

The owners are thorough in closing their shutters and curtains at night but appreciate the substantial change the draught-proofing has made.

The work was undertaken by Bath Restoration Ltd (www.restorebath.org).

A) the raised lower sash with the junction brush protruding from the upper edge

B) when the sash is lowered, this brush seals the junction tight

C) the brush on the bottom of the lower sash

D) the closed sash hides the brushes on both the bottom edge and the sides

A

C

B

D

Case Study

Secondary glazing

The installation of secondary glazing inside your existing windows is an effective way of reducing heat losses in the winter. Unlike shutters and curtains, which are usually open during the daytime, this method is effective 24 hours a day. In the traditional buildings of Bath, the installation of secondary glazing is sometimes preferable to complete window replacement because of the historic importance of the existing windows. Secondary glazing can reduce heat losses through the window by over 50% and will all but eliminate the draughts through your windows. Noise from outside will also be dramatically reduced.

Although secondary glazing preserves the existing windows, it is vital to ensure that there is no visual conflict between the original and secondary glazing. This can happen if the secondary windows have glazing bars that do not align with those of the original windows. Secondary glazing is usually designed with a minimum of glazing bars to avoid this problem.

If you have shutters, you need to ensure that the addition of secondary glazing does not obstruct their use. This typically requires installation within the architrave between the closed shutters and the existing window.

Temporary options

Secondary glazing can be installed on either a temporary (seasonal) or permanent basis. The temporary options tend to be a lot cheaper. The cheapest option of all is a proprietary film, available from DIY stores, that is stretched across the window architrave at the beginning of winter. With the aid of a hair-dryer, this film tightens and sets fast. You have no access to the window but your draughts are completely removed. The film is torn down in spring and replaced anew the following winter.

Another seasonal approach is to use sheets of acrylic plastic, cut to size, with a magnetic edge. These are held in place by discreet plastic carrying strips that are stuck to the window frames using double-sided tape which can be easily removed if need be. Come winter, the plastic sheet is simply held up to the window and locks into place against another magnetic band on the carrying strip (see case study). As with the cling-film, you no longer have access to the window during the winter months, though the sheet can be taken down temporarily if need be.

Secondary glazing of this kind can be almost invisible if installed with care and is entirely reversible. Furthermore, as the carrying strips sit within the window architraves, there is no conflict with shutters which can still be used as normal. It is an extremely low cost way of cutting out draughts and reducing heat losses in the winter.

Integrated secondary glazing

Secondary glazing can also be installed on a semi permanent, integrated basis. Although this is more expensive, as it effectively involves the specification of a new set of interior made-to-measure windows, it is much more durable than the temporary, seasonal options and will also be more effective in cutting heat losses. Ideally, use timber, slim-profile double-glazing (see below) for the secondary unit as this will dramatically reduce your heat losses. If you do, adopt the specification outlined below for low emissivity coatings, gas-fill and warm edge details.

If secondary glazing is to stay in place throughout the year, it must be openable to allow summer access to the original windows. This is normally achieved by dividing the window into two panels and allowing one panel to open. The glazing bar between the two panels should align with the centre bar of the original window. In the winter, it is best to keep the secondary glazing fully closed to minimise heat losses and reduce the risk of condensation on the primary window.

Case Study

Double glazing

Many people prefer double glazing to secondary glazing because the end result is simpler and easier to use. Arguably good quality double glazing also looks better, at least from the inside. Like secondary glazing, new double glazed windows will reduce heat losses through the window by over 50% and will all but eliminate the draughts.

The downside is the loss of the existing windows. However even this can now be avoided, at a cost. The following range of options is now available, starting with the least expensive:

- UPVC double-glazed replacement windows
- Standard timber double-glazed replacement windows
- Slim-profile timber double-glazed replacement windows
- Slim-profile double-glazed panes installed in original Windows

Plastic double glazing is not recommended. In fact, it is actively discouraged! If you are replacing timber windows, timber is the obvious choice for the replacement. In all traditional buildings in Bath, timber windows will be more in keeping with the building – and probably the street – and with proper maintenance they are likely to last much longer than plastic windows. Timber windows in Bath have survived for over two centuries.

Timber is also an environmentally-friendly material which locks up carbon for generations, whereas plastic windows are made from non-renewable petroleum products and generate environmental pollution during their manufacture and disposal. The very best ecological choice is a window made from timber from a forest that is certified as being well-managed (look for Forest Stewardship Council certification).

There are many different designs of timber double-glazed window to choose from. Ideally, you should match the glazing pattern of the original windows as far as possible, especially for prominent street-facing windows. If your windows are not original, this may be a good opportunity to return the windows to their original pattern. For example, traditional sash windows in the Georgian buildings of Bath usually have six small panes (or 'lights') in each sash, separated by narrow glazing bars. In many traditional buildings these have been replaced with single panes of glass, interrupting the rhythm of the glazing pattern across the facade of the building and the street.

Most double glazing has a deep gap (up to 24mm) between the two panes of glass. However this requires deeper glazing bars than those of traditional windows. Slim-profile double glazing has a much smaller gap between the panes, typically 3-6mm deep. Although this is slightly less effective in reducing heat losses, it allows the exact dimensions of the original glazing bars to be retained. However, new slim-profile double-glazed timber windows are likely to weigh more than the single-glazed windows they are replacing. If this is the case, and you have sash windows, you may need to replace the weights as well the windows.

Slim-profile double glazing is also used for the replacement of individual lights in sash windows. This is not straightforward, as the sashes have to be removed and taken to a workshop for the panes to be replaced, but it ensures that the original windows are preserved for another generation. It is even possible to specify glass for the outer panes that has the appearance of traditional crown glass. The Sash Window Consultancy, based in Bath, offers this service (see page 74). However some original windows in Bath may have such narrow glazing bars that even this option may not be practical.

For any double glazing, specify the following:

• a low-e (low emissivity) coating facing outwards on the inner pane, to reduce radiative heat losses;
• a gas fill (argon or ideally krypton) between the panes, to reduce convective heat losses between the panes;
• a 'warm edge' (the material between the panes), to reduce conductive heat losses.

Planning and building control

Listed buildings

If you live in a listed building, you must seek listed building consent if you want to install a roof window. This is because roof windows can damage historic Building fabric, if the roof is original, or change the character and appearance of the building, particularly if the window is installed on a visible roof. Proposals that demonstrate limited impact on 'significance' – the architectural, historic, artistic, archaeological or evidential interest of the building – would normally be granted consent.

Timber slim-profile double glazing is hard to spot. It is ideal for most traditional homes in Bath

You will need to obtain listed building consent to reinstate missing shutters but this is likely to be approved as long as the reinstatement is sympathetic to the design and materials of the window.

Done well, draught-strip ought to be all but invisible when installed on traditional windows. Nonetheless, listed building consent is normally required for any draught proofing which has a visual or physical impact on the window. For most listed buildings it is likely that an application for discreet means of draught-proofing will be treated favourably. However, consent may not be granted for historic windows in highly sensitive locations. Like-for-like renovations or minor alterations to parting beads to improve the fit of a window do not normally require consent.

Temporary, seasonal solutions to secondary glazing do not need listed building consent because they do not result in any permanent change to the character of the building, are easily reversed and have no impact on the fabric of the original window.

The introduction of integrated, fixed secondary glazing does need listed building consent. To improve your chances of gaining this consent:

• ensure that the proposed secondary glazing will not interfere with the use of shutters, if you have them
• ensure that the design is as discreet as possible and has minimum visual impact on the existing window, including careful alignment of glazing bars
• ensure that any distinctive architectural details of the existing architrave are not disguised by the frame of the secondary glazing
• minimise the number of permanent fixings required to secure the new frame.

Examples of draught-proofing products for different junctions (drawing courtesy of Changeworks)