

# Building and Maintenance Guide

## SASH WINDOWS

### A Guide to the Repair of Sash Windows

This leaflet should be read in conjunction with the Buildings and Maintenance Guide on Historic Glass.

Most houses in Islington, whether Georgian, Victorian, Edwardian, or even later have timber sash windows. These first appeared in Britain in the latter half of the 17th century and underwent considerable change in appearance over the next 200 years. Before the advent of the sash window, most windows were casements, often with leaded lights. The development of the sash window was paralleled by improvements in glass-making, which led to increases in the clarity of the glass and of available pane sizes.

### Design

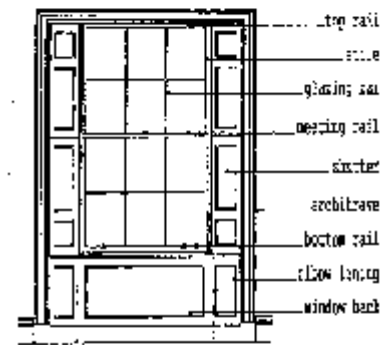
Sash windows are almost always of timber, usually softwood, although in grander houses hardwood, normally oak, was sometimes used. The sashes slide vertically in a box frame, counterbalanced by lead or cast iron weights suspended on sash cords. Early windows had small panes separated by thick glazing bars with robust profiles, but glazing bars were refined continually, becoming extremely delicate by the end of the 18th Century, with much variety in the profiles used. Glass was originally expensive to manufacture and was only available in small sizes. Improvements in glass-making allowed ever larger pane sizes so that it became economically possible to do without glazing bars altogether in the latter part of the 19th Century. Until the middle of the 19th Century all joinery was made using only hand tools, so that there are minute irregularities in each moulding.

The importance of the original windows to the fabric of a house cannot be too highly stressed. The original glass and the small variations in the joinery, resulting from original manufacture and from maintenance, wear and use, give character, from both without and within the house. Replacement joinery and glass will never exactly match the original. It is important to consider careful repair rather than replacement.

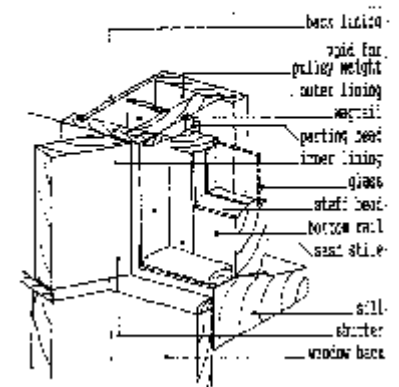
### Repair

Repair of sash windows is a relatively easy process and should always be considered as the first option. Only if the boxes or the sashes have deteriorated beyond repair should replacement be considered. The quality of timber and workmanship in earlier days was generally superior to that which is used today. Replacement, particularly in listed buildings and conservation areas, should always be in materials to match the original, never in metal or plastic. Sometimes the opportunity can be taken to reinstate missing original features or glazing bar patterns. Before about 1850 windows did not have horns on the sashes; these were introduced as a means of strengthening the sash as glass sizes increased and glazing bars were omitted. When replacing multi-paned sashes in houses before this time (and some after) always ensure that there are no horns on replacement sashes.

Before carrying out any work to windows, examine the glass carefully.



Internal Elevation



Typical Sill Detail

Where old glass survives every effort should be made to retain it, as it is an attractive and irreplaceable feature, often in the past unwittingly sacrificed when windows were repaired or replaced.

The Society for the Protection of Ancient Buildings publishes an extremely informative booklet<sup>1</sup> describing repairs in detail and if considerable repairs are planned this is a must, but a few general principles can be set out here.

### Deciding on Repairs

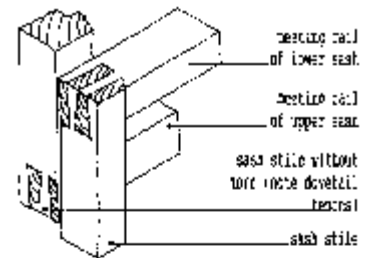
Before carrying out repairs, frames and sashes should be examined carefully to establish the extent of decay. This can be done using a pen-knife or other sharp implement to locate rotted timber. The most common repairs required to sash windows are the repair or replacement of sills, repairs to box linings and the repair or replacement of either the bottom rail or a glazing bar of a sash. Look out for decay at the ends of the sill, at the bottom of the box frame and in the joints and bottom rails of the sashes. The decay is most likely to be caused by wet rot, but in certain instances woodworm or dry rot could have affected the box frame. If dry rot is suspected advice should be sought from a specialist.

### Carrying out Repairs

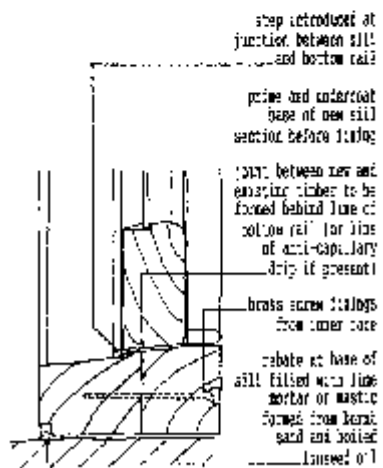
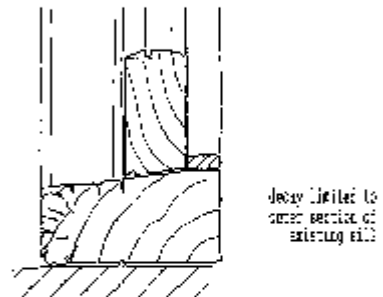
a) **Decayed Wood:** Very small areas of decay which do not affect the structural integrity of the joinery can be cut back to sound wood and filled with a flexible *external* filler. There is a flexible epoxy filler on the market which does the job extremely well<sup>2</sup>. Larger repairs should be carried out using timber of a similar species to that of the original, which in the case of sills is often oak. Softwood for repairs or replacements should be in a naturally durable species such as Douglas Fir (also known as Columbian, or British Columbian, pine). If a less durable timber is used, it should be vacuum impregnated with preservative. All new wood should be properly seasoned.

b) **Sills:** Decayed sections should be cut back to sound wood and new pieces of timber should be glued and screwed in place using external quality wood glue and non-ferrous (eg brass or stainless steel) screws. If the ends of the sill have decayed, it will probably be necessary to replace the whole sill. This can be difficult as the best join with the box frame is achieved if the new sill is inserted from underneath. To allow this, either internal plaster and brickwork or the external (stone) sill may need to be removed. If neither of these is possible (if, for example, there are elaborate architraves or shutters) it may be better to cut off the bottom of the inner lining, ensuring that the sill is glued and screwed to the pulley and outer linings. In extremes, it may be necessary to insert the sill in two pieces, halved in the middle with an overlapping joint, glued and screwed.

c) **Box frames:** Repairs generally involve replacing the bottom sections of the outer linings or of the pulley stiles. This can normally be done *in situ* and the joints should be formed in such a way as to throw water out of, rather than into, the joint. Joints should, where possible, be both glued and screwed.



Junction of Upper/Lower Sash



In Situ Repair of Sill

**d) Sashes:** joints between the bottom rail and the stiles of a sash are often loose. Sometimes all that is necessary is to reglue the joints; at other times the bottom rail or the stiles may need to be repaired or replaced.

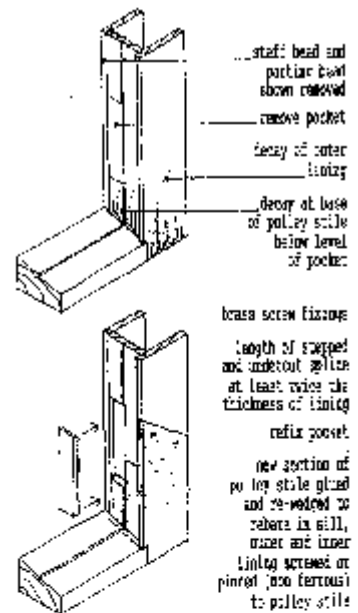
If a sash is to be replaced, the old glass should be removed and re-used in the new sash. If a sash is to be repaired the old glass should be removed before doing so. There are various traditional techniques for this, but they are time-consuming and not always satisfactory. An electrical infra-red lamp has been developed in Sweden and is available in this country<sup>3</sup>. This softens the putty without either scorching the timber or over-heating the glass. When the putty is softened it can be cut out and the glass carefully removed, labelled and put safely aside for refitting after the repairs.

**e) Replacing a Sash Cord:** Even if the other cords appear sound, it is usually sensible to replace them all. This can be done as follows:- The lower sash is first removed by carefully taking off the *staff beads*,<sup>4</sup> which will free the sash. Disconnect the sash cords from the sash and tie a knot in the cord to prevent the sash weight dropping to the bottom of the box. Take out the *parting beads* and the upper sash will now be free to be removed, restraining the sash cords as with the lower sash. Take out the *pockets*, which are loose pieces of wood normally held in place by the parting beads; by moving the *wagtail* from side to side and letting down the cords it should be possible to find the *weights* in the box. If any of the glass has been changed since the windows were hung, the sashes should be weighed at this stage.

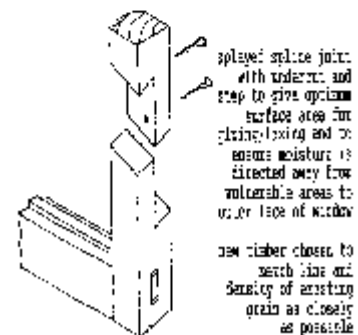
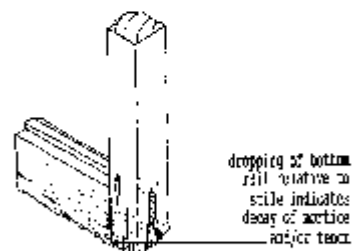
A new length of cord (waxed sashcord is best) is weighted with a nail, threaded through a pulley and allowed to drop until it can be reached through the pocket. The weight should be tied to it with a secure knot (bowline or similar), with *make-weights* added as necessary to balance the weight of the sash, and replaced in the box. When all the cords have been inserted in this way, the free end of a cord is then nailed with three flat headed nails into the groove in the side of the upper sash, adjusting the lengths of the cords so that the weights do not quite touch the bottom of the box when the sash is at its highest point. When the upper sash has been hung the pockets can be put back and the parting bead replaced (or renewed if damaged). The lower sash can then be rehung, finally replacing (or renewing if damaged) the staff bead, ensuring a firm, but not tight, fit.

### Draught Proofing

Old windows can become draughty and sash windows are no exception. This is often seen as an insuperable problem and a reason for replacing either the sashes or even the whole window, with the loss of many fine original windows and their glass. *This is not necessary.* Sash windows can be draught stripped very satisfactorily, with the added bonus of reducing fuel bills, improving sound-proofing and making the windows easier to operate. It is possible to carry out a reasonable do-it-yourself job, but fitting is much better



Base of Pulley Stile



Bottom Rail/Base of Sash Stile 3

carried out by a specialist. There are several companies who have developed systems in which draught-sealed staff and parting beads are fitted and seals are introduced between sashes, making an invisible and extremely effective draught seal. At the same time they will all overhaul and repair the windows, including replacing sash cords and adjusting weights. The cost is far less than that of replacement windows.<sup>5</sup>

### Double Glazing

Double glazing sash windows can seldom be done satisfactorily. The glazing bar profiles are not normally deep enough to take a sealed unit and the result can look extremely unsightly. In addition, the weights will not be large or heavy enough to counterbalance the additional weight of the sashes. Secondary glazing can sometimes be fitted if there are no shutters, but it can spoil the look of the windows, with the additional frames and double reflections in the glass. However, if windows are draught-proofed as described above, it may well be found not to be necessary to double glaze. Heat loss through the window will be significantly decreased and sound insulation will be increased. Double glazing or secondary windows will make very little additional difference to heat loss and are never cost effective.

### Paint Stripping and Painting

In the course of repairing or decorating windows it may be necessary to strip the paint. This should not be done as a matter of course, as the paint itself is not only part of the historic fabric, but also an important part of the protection against decay; as much original paint should be left on as possible. The paint originally used will almost certainly have been linseed oil based and will have had a significant lead content, both of which assist durability of the timber. Modern paints have very different properties from traditional paints, often forming an impervious skin, and as a result can be more likely to entrap moisture in the timber, increasing the chances of decay. Unless the building is listed Grade I or II\* (of which there are very few in Islington) lead paint may not be used in redecoration. Linseed oil paints are available<sup>6</sup>, but there are also modern paints which are suitable for use in external joinery. These are known as “vapour permeable” or “microporous” paints and most manufacturers now make their own version.

In stripping old paint always remember that the dust from it may contain lead and it should therefore be damped down, kept well out of the range of children and disposed of safely. **DO NOT USE A BLOW-LAMP** for stripping lead paint.

