

TECHNICAL NOTE No. 48

June 1992

Updated January 2006

Windows and Doors

Historic windows are the subject of a detailed guidance note in preparation by EHS.

Historical Note

Of all building elements, windows, doors, their fittings and embellishments can often tell more of the history of a building than any other.

(A) Windows:

Glazed windows were certainly in use in Roman times but it was not until the 17th century that any but the very wealthy could afford them. The earlier forms were either fixed lights or side hung casements but by 1700 the vertically sliding box sash had become the most popular form.

Glazing patterns and associated joinery details developed and changed but this basic form remained in vogue into the beginning of the 20th century, when factory made metal and wooden casements became widely available at relatively low costs.

Side hung casements were used to a limited degree throughout the same period. Cottages built by the larger landowners were very often fitted with this type of window.

Leaded windows have also been in use since very early times. In the late 18th century some of the simpler forms of leaded window were copied in cast-iron, but again these forms are rare in comparison to the vertically-sliding timber sash.

Early sliding sashes were fitted from the outside so that the full depth of the box frame is exposed. This method of fitting continued throughout the popularity of this window type but it became gradually more usual to fit the box behind the masonry or brick reveal. Early windows, and in later years small windows, were not hung, i.e. had no weights or cords or sometimes had only one sash of the pair hung. Early glazing patterns are for small panes of glass; this was simply dictated by manufacturing limitations. Blown glass was replaced in the 18th century by glass spun on a cylinder. Both the types have very attractive irregularities that set up characteristic reflection patterns. In the 19th century new techniques developed sheet and plate glass. These methods of manufacture provide much larger and more regular pieces and therefore much more freedom in glazing patterns. By the end of the 19th century a sash could be glazed with one single sheet of glass. This put more stress onto fewer joints and to counteract this weakness, horns were formed on the vertical members. The second half of the 19th century also saw the end of window tax (which had operated from 1696 - 1851) and the production of cheap stained glass. Both factors added to the growing variety and size of domestic windows.

By the time the sliding sash had developed, home grown timber was in very short supply and most these units were made from imported soft woods from Northern

Europe; later examples make use timber from forests of the Empire, mainly North America. The expertise needed in selecting working these timbers developed through the 18th century to produce incredibly slender and beautifully moulded components, not only for the windows themselves but for beautifully panelled and shuttered encasements which became important parts of the designs for room interiors as well as the appearance of the building from the outside. Because of the timbers used and the methods of construction sliding windows were always painted in this country. There are rare examples of oak being used unpainted.

Most box sash windows are single rectangular units with the vertical dimension greater than horizontal. However, fashion brought variations to more prestigious buildings. Some examples are:

- i. The grouping of three units together known as Venetian windows, the centre unit having semi-circular head; these began to appear about 1730;
- ii. one semi-circular opening containing three units, known as the Diocletian windows, pointed or ogee-headed openings with interlacing glazing bars known as Gothic; both had appearance in about 1765;
- iii. a rectangular opening containing three rectangular units became fashionable from 1790 onwards;
- iv. a pair of similar sized sashes within a single rectangular opening was the last significant development of about 1860;
- v. horizontally sliding sashes do exist but are very rare indeed, they have the same appearance as the true paired vertically opening unit, but are usually much older.

The changing forms of panelling and mouldings that form encasements are also good guides to dating alterations if not the original construction of the building. If during repairs these features are not recognised and retained much of the historic interest of the building will be lost to future generations.

(B) Doors:

The development of doors closely follows that of windows. The joinery details, mouldings, etc are all related, in most cases the timbers used were the same, although imported hardwoods are used for internal paneled doors in some of the more important buildings. Such doors were not painted. Most old doors belong to one of two basic types - the boarded or sheeted door and the paneled door.

Early boarded doors were made from very wide planks simply jointed and held together by broad horizontal rails on the inner face. As time went on the boards became narrower and the jointing involved. To the ledges were added diagonal braces and latterly a complete jointed frame. Most early hinges are simple forged straps fixed with wrought nails; in the 19th century the 'T' hinge fixed with screws takes its place. Early fastenings are timber draw bars or lifting latches which in the 19th century are replaced by iron thumb latches and later still by mass produced steel latches of a similar pattern.

Panelled doors in the 17th and early 18th century come in a wide variety of panel formations; architraves are broad and often heavily moulded. By the end of the 18th century the 6-panelled door was the popular form with a careful gradation of size, proportion and detail. Separately applied 'bolection' mouldings (see note 41) had been replaced in time by carefully worked mouldings on the arrises of the frame rails and

muntins. Scholarly copies of classical details were assembled to form the encasements, often linked with a decorative fanlights and side lights.

Porches are rare until well into the 19th century when these features were often added to older buildings. These were not always added with the sympathy that such an important feature deserves. As the 19th century proceeded 4-panelled doors became more popular, bolection mouldings came again into use and the pattern of architraves and encasements were courser and no longer followed recorded antique forms.

Fittings developed from face fitted 'H' or 'L' shaped hinges of the forge, to cast leaf hinges, concealed in the interface between door and frame. Early locks are all rim fittings mostly operated by iron or brass drop ring handles; lock facings and finger plates are sometimes highly decorative. For external doors, locks with a double thrown action were often used, backed up by simple but sturdy draw bars.

By 1800, knob furniture was more common, often made of porcelain and highly decorative. Later mortice locks replaced the rim patterns and lever or simple undecorated knob furniture was used. Generally external doors did not have handles as part of the lock or latch but were drawn to by means of a heavy knob centrally placed or a ring that may also serve as a knocker.

Like windows, external doors were painted until in the late 19th century imported hardwoods became cheap enough for some people to use them for entrance doors as well as internal doors to the principle rooms.

Faults and Repair

The timber used for joinery in the 18th and 19th century was generally carefully selected and the joints were tightly formed, the tenon being drawn by a peg into the mortice against the shoulders of wedges. As an added precaution the joint was fitted before assembly with hot animal glue or white lead thus making it waterproof. Consequently, provided the unit has not been forced or otherwise abused while repainting, and glazing putty, etc, has been regularly attended to, faults should be few.

However, the sad fact is that many of these carefully constructed units have not been cared for as they deserve. Sheer neglect coupled with misuse are the major destroyers of historic joinery. Windows commonly suffer from broken cords, seized pulleys, and distorted catches. During reglazing instead of cleaning out the reveals, successive levels of perished putty had often been built up one upon another; condensation has entered the timber through the perished putty so that finally there is nothing to hold the glass in place. These units become draughty and are no longer weatherproof; they are then condemned wholesale without serious regard for the very real chance of repair.

Doors similarly suffer from neglect of painting, and the severe wear of hinges and thresholds. Often these faults are not analysed and the decision is made to replace the entire unit with a needle loss of historical material.

Structural movement, the failure of lintels or other local failures such as the rusting and consequent swelling of iron cramps in adjacent stonework are all serious threats to the joinery itself. Distortion of the opening leads the masonry and joinery to part company, water enters the gap and decay follows. More movement may strain open (wrack) the joinery joints followed again by entry of rain or condensation and consequently the decay of the timber around the joint.

Insect attack is rare unless beetle has infected the timber before it was converted for joinery.

Regular checks for all windows and doors should be made in advance of each programme for redecoration and the necessary repairs completed before redecoration is implemented.

Note - with higher heating standards and increased heating bills, owners are becoming more aware of heat loss around windows and doors. Properly fitting units will go a long way towards reducing heat loss. The setting of ironmongery, stops beads, etc, will greatly improve performance, and further increased efficiency can be obtained by fitting draught proofing strips. Most of the better draught proofing strips are best fitted when the units are dismantled. This modification can be made without any change in the appearance of the units themselves. Remember to consider ventilation when fitting draught proofing. Otherwise condensation may become a problem. A passive ventilation system, vents through the sash box or ensuring a flue remains open may become necessary.

Double glazing is another means of heat conservation. Many older buildings have relatively small glazed areas in comparison with the overall area of wall and the savings to be obtained may well not be an economic proposition. English Heritage have calculated that it will take 60 years on average to repay the cost of installing double glazing in terms of savings on energy (see Framing Opinions leaflets). It is much more energy efficient to increase insulation elsewhere. If improvement of the performance of windows is considered necessary then secondary glazing is a more acceptable solution. This gives much better thermal and sound insulation characteristics and does not damage the historic window. Secondary glazing bars should follow the pattern of the existing windows. Double glazing will not be permitted by Environment and Heritage Service for Georgian Paned Windows. This is because the glazing bars will have to be thickened to accommodate the units altering their appearance. Note: Double glazing is an alteration which requires listed building consent.

Notes on the Preparation of Contract Specifications

- Identify units for repair and replacement.
- Describe the necessary repairs for each unit and the design - mouldings, panels, shape of glazing bars, etc, to be used for replacement.
- Describe the materials to be used - type of timber, type of glass, ironmongery, etc.
- Give instructions for dismantling, stripping off old paint and putty, storage and care of material for reuse.
- Name any preservative treatment of timber and the priming for all surfaces before assembly or glazing.

Further Reading

Andrew Townsend and Martyn Clarke, The Repair of Wood Windows, SPAB technical Pamphlet 13, London, 1992.

Framing Opinions, 1 Draught Proofing, English Heritage, London 1994 ref XH20020
Framing Opinions, 2 Door and Window Furniture, English Heritage, London 1994 ref XH20021
Framing Opinions, 3 Metal Windows English Heritage, London 1994 ref XH20022
Framing Opinions, 4 Timber Sash Windows London 1994 ref XH20023
Framing Opinions, 5 Window Comparisons, London 1994 ref XH20024
Framing Opinions, 7 Energy Savings English Heritage, London 1994 ref XH20026

Lydia Wilson. [Framing the View: Windows for a Sustainable Future](#), Belfast, 2001.
(Available on EHS website)

[TAN3 Performance Standards for Timber Sash and Casement Windows](#), Historic Scotland Edinburgh, 1994.

Nessa Roche, [The Legacy of Light, A history of Irish Windows](#), Wordwell Ltd , Wicklow, 1999.

[The Georgian Group Guides No1 Windows](#), London, 1990

[Period Houses, A Conservation Guidance Manual](#). Dublin Civic Trust, 2001.
Chapter 15 Windows.

Doors

[Timber Panelled Doors and Fire](#), English Heritage Technical Guidance Note, London, 1997.

[The Georgian Group Guides No3 Georgian Doors](#), London, 1990.

[Period Houses, A Conservation Guidance Manual](#). Dublin Civic Trust, 2001.
Chapter 16 Doors and Doorcases.

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