Living with – and repairing – sash windows.

Before working on a sash window, there is a real need to understand how it was originally fitted and why!

Ventilation

This is more important than it seems. The boxes were usually fitted into brickwork that was designed to be at least 2" wider than the sash box and at least 3" taller than the box itself. It was laid against the projecting brickwork and held in place with folding pinned wedges, between the frame and the wall.

This allowed six things to happen

1. The joiner could align the box frame in the wall without using any nails, which might have twisted the frame and, in time, rusted it.
2. The gaps around the frame ensured ventilation all around the box.
3. No wet mortar slumped against the frame, stopping ventilation, and, if the brick mortar had rested against the frame, it would allow damp to transfer.
4. Because the sash was installed before any external render was applied, the plasterer could work his render into the small gap between the brick and frame to create a weather-tight seal.
5. If water did get past the joints or the pulley rope holes, the natural airflow would dry it out before rot could take hold.
6. The plasterer could work his render up to the underside of the cill, sealing it and ensuring the drip groove cut into the underside remained clear, maintaining good weathering characteristics.

Problems and what to do about them

This guide outlines the correct procedures to follow, so you know what should – and shouldn't – be done.

Sashes have a tough life. Glass breaks, putty leaks, mortice joints fail, locks get wrenched and meeting rails (4 – see the diagram at the end) can split. Pulley axles (20) wear away. They do need TLC.

Heritage Building Advisors, The Office, 37 Kings Road, Lancing, West Sussex BN15 8EB
t: 01903 529129 m: 07966 203390 e: neil@hbaassociates.com

The good news is that a sash window that has been correctly installed and properly maintained should last for 200 years or more – even when they face the sea.

Rotting cills/boxes

The main areas at risk are usually where the box stiles are cut into the cill or the underside of the cill (15), if moisture has been trapped.

If there is not too much rotten wood, dig out the pulp, expose the remaining wood so it can dry, then cut in new wood. For small areas use two-pack resin filler, sanding down to give a smooth surface before you repaint.

If a significant proportion of the cill has rotted, cut it out by removing the mortar from under and around the ends, cut in half or the cut out the mid-section, tap the sections down into the void created and take out. If the bottom of the sash box stiles has rotted, only cut out the rotted wood. Track down high RPI (rings per inch) reclaimed pine, work to replace and glue in using a modern resin glue designed for outside use, such as Gorilla wood glue.

Rattling and draughty

Curing this means taking the sashes out of their frames.

First, ease out the stop bead (17) and the parting bead (16). Then remove the pocket piece (23) cut into the lower part of the pulley stile. Drive a pin/nail through the exposed ropes near the pulley into the pulley stile face. This will allow you to lift out and free the sashes of the cord as the weight (18) is now trapped. When clear, holding the rope, release the pins, lower the weight gently down and lift out.

Rework the sash by cleaning off built up paint using chemical strippers such as Blackfriars' paint and varnish stripper (never burn or sand off because you will probably release lead paint fumes and crack the windows), scarfing in pieces of wood as required, re-glue tennons etc. Check for good closure at the meeting rail (4) kiss faces.

Note: meeting rails often get broken by a sash fastener embedding or smashing into the rail when passing and may need replacing entirely.

If the meeting rails are not aligned, plane off the bottom face of the lower sash bottom rail (3) until all fits well. (You may need to repeat on the top sash rail – 2). Re-rope, return all with correct length by closing the windows. If the rope can be pulled away from the stile with a 75mm – 100mm gap then all is good. The weight should not hit the cill horn (15) when sash is raised to the top of its run. Re-install/replace the stop and parting beads.

Badly weighted sashes

When smaller, lighter panes are substituted for larger, heavier glass the sash needs heavier weights to balance it once more. The 19th - 20th century answer was to add a lump of lead to the top of the original, round weight. This did the trick, but reduced the travel of the weight in the box and thus the sash.

Today you can buy square section lead weights that return full travel to the sash (more mass/weight in a shorter length.) The installed parting slip (Wagtails) (12) must be there if square weights are used, as this prevents them crashing when passing in use.

Weigh the glazed windows and weights (bath scales are good) then acquire additional weights, if needed.

Before replacing the cords, parting and stop beads, ensure that the meeting, top and bottom rails, are fitting flush when the catch is engaged. (See Rattling and draughty)

Now rub a beeswax block up the sliding faces to help them move smoothly.

Pulley failure

Whenever your window is overhauled, always take the pulleys out, even if they are resistant. Check for axle wear, rusting and cracking. Make sure that the wheels still spin easily and look for warping of the plate (this is the face the screws go through to locate and hold it in place)

Only replace the pulleys as a very last resort! Modern versions will not work as well, or last as long. Architectural salvage is a better alternative but re-cast originals are also available. Try searching for *Traditional cast brass sash pulley with 1 3/4" wheels* on the web.

Change to double glazing?

On the face of it, it seems like a good idea. Let's move into the modern era and improve our homes' heat retention and reduce our carbon footprint.

It doesn't work.

The sashes are made to a certain thickness to cope with a single glazed section, allowing a good putty line to exist, thus protecting and weathering in the glass to the timber.

The sashes have to carry this glass and in total, represent a certain weight. The mortices are designed to carry, over time, the weight of the glass.

The weights held within the boxes are designed as a pair to counterbalance the sash.

The dynamic changes completely if you install 10mm/12mm thick double glazing. I recommend searching the web for information about the survivability of these types of double glazing.

Without going into all the technical detail (info is readily available on the internet), the weight changes.

Implications

Removing the old glass removes part of the history of the window and you might have some ancient Crown glass. The effort of removing the ancient glass and its putties can present a long and harmful process, damaging the glazing bars/tongue.

Double glazing will require bedding onto a recommended mastic and, along with the reduced putty section, creates both a questionable weather edge and a rather incongruous looking result. In reality, it's a non-starter.

The increase in weight will impose a loading on the mortices of the sash and its glazing bars. This creates the possibility of failure in the medium term.

The increase in weight will require heavier balancing units thereby increasing the length of the weight within the box. The increase in length will dictate the available travel of the sashes and in many cases, reduce the travel by as much as one quarter, – so you can't open the window as far.

The pulleys installed are usually quite old and their axles a little worn. The extra loading will accelerate the point where they will fail.

New pulleys, bought from your local hardware store, are inferior in construction and, if fitted to replace originals, will probably fail early. (See Pulley failure)

You can buy square section lead with a hole through the middle to allow for the cord to travel through the pre-cut to weight/length to fit.

These are not cheap, also, unless you chamfer the heads and bottoms of them, (they may clash on passing their neighbour).

Note: very few of the original parting slips (wagtails) (12) will have survived to the present day and the old cast iron weights were given the rounding chamfer as part of their construction.

Opening up the access pockets (23) to get to the weights, you will find that the available gap is just large enough to allow the cast iron weights to be removed/replaced. Lead weights may have to be specially cast to accommodate the ability to enter the box.

Alternatively, you can have new sashes made to accommodate the deeper section required. This effectively means they will not fit the original boxes. Or make new sashes to fit old thickness….

Therefore, you need to have new, wider boxes made and fitted, along with the new, double glazed sashes – expensive and not a good idea. And they will not fit the location because they're wider.

Alternatives: (better ones)

There are a number of very good, efficient companies that are well able to take out your sashes and reinstall them complete with draught brushes, worked to fit correctly with meeting rails able to close against each other. They will be draught sealed, work, and mean the glass is able to be cleaned outside, as the top sashes will have been released able to function as they were always intended.

By simply draught proofing your windows, you will find a happy middle ground without expending/wasting large amounts of money and increasing your carbon footprint to boot. English Heritage has a good article on their website suggesting that this system may improve thermal performance by some 40 per cent. And fit curtains.

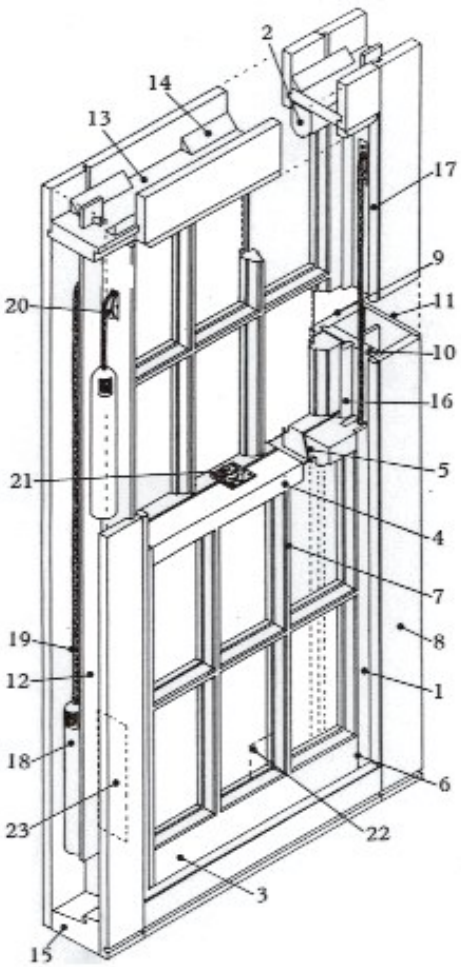
Further don'ts

- Replace a cill with green (new) oak or pine
- Glue joints with internal grade PVA glue
- Use lubricating oil to ease the sashes.
- Use large nails to fit stop beads, or any nails at all on parting beads
- Use any cord other than waxed or white polyester braided cord

- Fit modern pulleys, which are usually made of tin plate, can be brass plated and not cast fascia plates – as a result, they rot and buckle/break within a few years, guaranteed. Do: fit cast brass items (available on the web) and Vaseline axles well. Or use modern ball bearing race units but pre-paint plate in a marine gloss well, then fit.
- Fit/re-fit with fixer foam squirted into the gaps. This stops ventilation and can fill the box and, in extreme cases, can grab the weights. Use folding wedges only.

DIY it? If not confident, get a professional.

Diagram: the naming of parts



1 Vertical stile
2 Top rail
3 Bottom rail
4 Meeting rail
5 Bevelled face
6 Through mortice and tenon joint
7 Glazing bar
8 Inner lining
9 Outer lining
10 Pulley lining
11 Back lining
12 Parting slip
13 Soffit lining
14 Triangular fixing block
15 Cill
16 Parting bead
17 Stop bead
18 Counter weight
19 Sash cord
20 Pulley wheel
21 Sash fastener
22 Single sheet glazing held in place with sprigs and putty
23 Access pocket

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Credit: kind permission of Hampshire sash window services.
See https://www.hantssash.co.uk/glossary

Their mantra is "repair, refurbish, renovate" and then, if really unavoidable, "replace". I agree.

Many thanks to Rob & Rupert for their invaluable input to this guide.

Written and edited by Neil England, based on more than 50 years of hands-on and material investigations, reading a few very interesting reference books and always asking/watching a few very clever old Master Craftsmen.

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