Historic England

Inspecting Stained Glass Windows

A Flowchart for Architects and Surveyors

This flowchart is intended as a general guide for building professionals who do not have experience in assessing stained glass windows, but have been asked to undertake a basic survey.

If your inspection reveals any potential causes for concern (whether with the glazing, or with any associated elements such as the window surrounds or supporting metalwork), you are strongly advised to encourage your client to bring in specialist conservators with appropriate experience.

Stained glass can be particularly difficult to survey from ground level, mainly due to its size and location. Therefore it may not be possible to address all the questions provided in this flowchart. If scaffolding is being erected on the building for other reasons, it would be a good idea to use this as an opportunity to also inspect the glazing.

Photographing a survey is always useful because dated photographs are likely to prove invaluable in the future when custodians or conservation specialists are trying to assess rates of deterioration. If resources permit, photography and note-taking could be exhaustive, but otherwise recording should focus on illustrative phenomena, or areas of particular concern.

PART A: Discuss stained glass issues with the building custodians		
1	Why are the building custodians concerned about the glass? ▪ Are there new management practices? ▪ Has there been recent damage, or has deterioration been only recently noticed?	If there are serious concerns, recommend completing Step 2 and then moving straight on to **Part F** (consulting a specialist stained glass conservator). If the custodians simply wish to understand whether more consultation is needed, move on to **Step 2**.
2	Work with the custodians to collate all the useful information they may already have about the glass, including: ▪ what is known locally about the history of the windows ▪ vandalism occurrences or threats ▪ historic repair programmes to the windows and building Is any glass in storage somewhere (for example fragments from vandalism, or panels removed during building works)? Custodians will see the windows and building at different times of the year and under different weather conditions, and so are an invaluable source of environmental information. What can they say about: ▪ how the building is used? ▪ how the heating is run? ▪ leaks or condensation events on the glass?	This information will also be useful if a specialist conservator is consulted. With this information available, move on to **Part B.**

PART B: Examine the windows in the wider context of the building		
Check exterior		
1	Are all the building features designed to protect the wall and window from water (such as gutters, hoppers, hood mouldings and cornices) in good functional condition?	Note any flaws or failures, and plan for repair or improvement.
Check interior		
2	Are there any signs of rainwater penetration through the window, such as calcium deposits on the inside of the glass, or streaks from moisture running down through surface dirt?	Try to link interior moisture runs with weaknesses visible on the exterior.
3	Are there any signs of condensation problems, such as extensive dripping or streaking on the sill and wall underneath the window, or algae on the glass?	If there appears to be a condensation problem, move on to **Step 4.** Otherwise go to **Part C**.
4	If there is a condensation problem, try to identify the source(s) of excess water. Check for: ▪ ingress of rainwater or other water (drains, runoff) into fabric ▪ plumbing and heating leaks ▪ internal sources of water vapour, such as gas combustion (heaters and cookers), and building use (laundry, cooking, cleaning) ▪ operation of temperature-control systems (for example, episodic heating can pull moisture from fabric and furnishings, which then condenses on glass)	Note any flaws or failures for repair or improvement, or for further investigation.
5	Does the window have a drain or cill tray, or some other system to collect and remove condensation at the base. If so, is it in good functional condition? If not: ▪ could a drain or some other system be provided? ▪ is there some other way to deal with condensation run-off?	Note any flaws or failures for repair or improvement, or for further investigation.
6	Could the management of the interior environment be exacerbating condensation: for example, building use patterns, or heating regimes?	Consider consulting a building performance specialist.
PART C: Check the window surrounds		
1	In what condition are the wall and window surrounds? For example, are there any signs of deterioration to frames, mullions or tracery? Is there an obvious cause for any observed deterioration (for instance, could water ingress be causing rusting of embedded metal cramps)?	Note any flaws or failures for repair or improvement, or for further investigation.
2	Are there any window guards, and, if so, what kind? How are they fixed in place? What is their condition?	Note down any flaws or failures for repair or improvement.

PART D: Check the window frame and supports		
1	What type of support has been provided for the glazing? Does it appear to be contemporary with the glass, or has it been altered?	
2	Look for signs of deterioration: ■ material failure, such as corrosion of ferramenta or decay of timber. This will usually be water-related, and because water runs down glass, it will often be worst at the base of the window ■ systemic failure, such as loosening or snapping of supports or the ties attaching the glass to the supports (usually due to wind pressure causing metal fatigue)	If there are problems with the frame or supports, move on to **Step 3.** Otherwise go to **Part E**.
3	Identify source(s) of failure, such as exposure to wind pressure, inadequate support from insufficient numbers of bars, or copper ties not spreading the load of the glazing correctly.	Note down any flaws or failures for detailed investigation, repair or improvement.
PART E: Check the stained glass on both the interior and exterior, using close access if possible, but otherwise using binoculars		
1	Is there any distortion of the glazing? If so, how tightly does the glass fit into the glazing groove? Are there other signs that thermal movement is causing a problem, such as cracking of perimeter glass? Are there any signs of problems with the ties between the glass and the supporting ironwork? Are they lost or broken? Are problems localised to one window, or more generally visible?	Technical problems may be due to problems with the original design, or with later repairs.
2	In what condition are the cames? Do they look stable, or are they cracked and distorted in places?	Check the repair history: how recently was the window re-leaded?
3	In what condition do the solder joints appear to be? Could failures be weakening the structure?	
4	Are there signs of failure of the glazing cement, such as loss of colour at the edges of the glass?	If the sealants are failing, rainwater can penetrate.
5	Is there damage to or loss of the paint layer (including flaking or powdering)? If so, is there any pattern to the damage?	Cleaning with insufficient care or the wrong tools can be a source of damage.
6	Is the glass surface pitted or holed (corroded)? If so, is there any pattern to the damage?	Deterioration of glass may be worse for certain colours, or associated with applied paints.
7	Are there any broken panes (including previous breaks that have been repaired)? If so, is there any pattern to the damage? Where possible, identify the source of breakages: is it vandalism or an accident? Is there a serious ongoing risk?	If the risk of breakage is ongoing, consider preventative actions (for example, changes in management and/or installing protection).
8	In summary: do there appear to be problems with the stained glass and/or the glazing system that need to be dealt with?	If no, continue on to **Part G**. If yes, bring to the attention of the custodians and move on to **Part F**.

PART F: Call in expert stained glass conservator		
1	An expert conservator will be able to: ■ assess the significance of the stained glass ■ undertake a condition survey ■ work closely with you and any other conservation experts to produce recommendations for treatment, repair and care	If there are problems with other elements of the glazing system, such as the ironwork or the stonework, or environmental problems, other conservation specialists may need to be consulted as well.
2	Discuss with the building custodians what is needed for a survey by a specialist stained glass conservator. For optimum benefit, the following basic information should be gathered together and either provided to the conservator in advance, or made available during their visit: ■ plans, elevations and other drawings of the building and window ■ details about any building-level problems that you feel may be affecting the stained glass ■ as much historic information as possible (such as notes from previous repairs, old photographs); this will help the conservator to make a judgment about the rate of any deterioration It may well be necessary to organise close access to some or all of the windows (preferably using scaffolding, which is more stable).	Bringing together all the information the conservator might need in advance, especially drawings and elevations, can save them hours of work. This process will also inform the building custodians and their professional advisors of what is known and not known about the glass. This makes for much more productive and informative discussions when the conservator arrives on site.
3	Discuss how to exploit the opportunity provided by access to make a photographic record of current condition.	Encourage building custodians to archive records of all investigations and interventions, preferably as part of the building record.
PART G: Develop ongoing care programme		
1	The programme for ongoing care will need to cover: ■ instructions for day-to-day care (such as cleaning) ■ regular surveys (such as quinquennials) ■ scheduling of surveys after major events such as storms, and other actions to be taken in the event of an emergency	Since inexpert cleaning can be a major source of damage, you should ask a specialist stained glass conservator to develop an appropriate methodology for day-to-day care.
2	Encourage custodians to schedule detailed condition surveys by specialists at more widely spaced intervals.	A stained glass conservator can advise how often each window should to be checked over by a specialist.