

A Guide to the Maintenance of Historic Church Buildings



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The content of this guide is offered in good faith but neither the author, The Diocese of Ely, SPAB or the Heritage Fund can accept responsibility arising from incorrect or incomplete information that may be included. Consult with your architect/surveyor and qualified professionals where needed and follow manufacturers and supplier’s guidance.



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Section One: Maintenance Matters

What is Maintenance

Historic buildings are constructed from natural materials which have a finite lifespan. So, whilst we tend to think of old buildings as being timeless, we have to accept the fact that they will decay; **all buildings** start to decay as soon as they are complete. This guide, whilst written with historic churches in mind, will still be relevant to all types and ages of buildings.

It is important to point out that maintenance is different to repair. Repair is work done to put right defects, significant decay or damage. Maintenance on the other hand, is work done to slow down that rate of decay by keeping the fabric of a building in good condition.

Maintenance is essentially the routine work needed to keep the fabric of a building in good condition.

Maintenance can be split into two activities – looking and doing.

Looking: Inspecting the building to assess its condition, noting any problems or areas of concern and seeking advice to determine whether it might be necessary to carry out repairs.

Doing: Carrying out specific tasks such as cleaning drains and clearing debris from gutters and rainwater pipes.

Lack of maintenance is one of the key reasons why old buildings deteriorate.

A lot of problems with buildings are caused by nothing more than not keeping the weather out and allowing plants etc.... to take hold. Although old buildings can stand a fair degree of neglect there comes a point where structural problems and collapse become an issue.



Understanding the Building



Lancelot 'Capability' Brown, who is credited with creating some of Britain's most iconic gardens, is buried in Fenstanton.

The first step to maintaining any building is to understand it. Start with the significance and the value of the building; what makes it an important part of local and national history and heritage and why is it valued by the church and wider community. If you don't already have a Statement of Significance, this is the time to write one, if you do, check that it is up to date.

Visit the Diocese of Ely's website for advice on how to create a Statement of Significance for your church building.

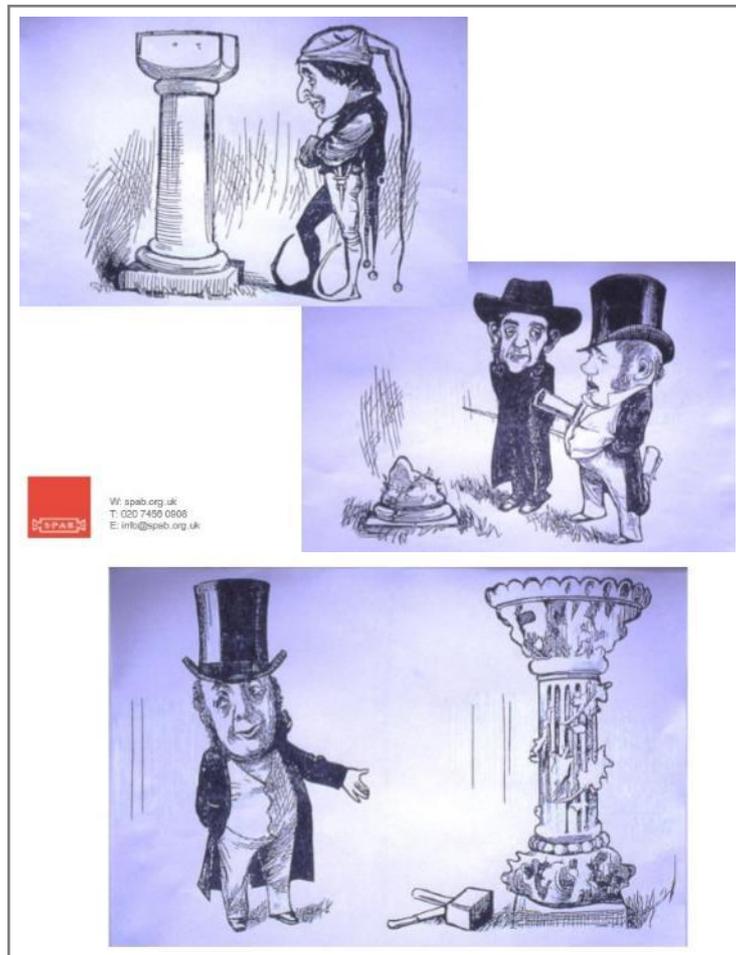
Next it's a good idea to familiarise yourself with the materials and construction techniques used in your building as well as some of the key architectural terms. A Glossary of key terms can be downloaded on the Diocese of Ely's website (see Section Five).

Building materials and techniques have changed considerably over time, to the point where using modern materials and methods on older buildings can do more harm than good.

A key point to remember is to only use materials and techniques that are sympathetic to your building.

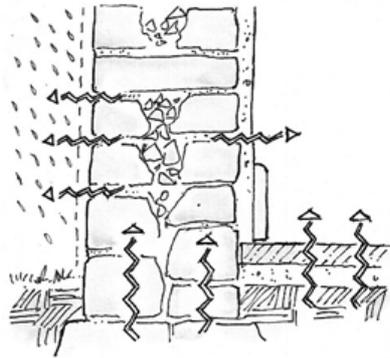
Whilst this approach can be criticised in the short term for making the care of buildings seem more complicated and costly, the long-term benefits are generational; conservation *is* better than restoration.

The images below are 19th century cartons from *Punch*. In the top image, a Medieval craftsman admires his stonework. Time goes by and weather and erosion take their toll until a Victorian Architect shows up. “I’ve resorted an entire Cathedral based on less than that” he claims and proceeds to rebuild the column, creating a restoration that is nothing like the original.

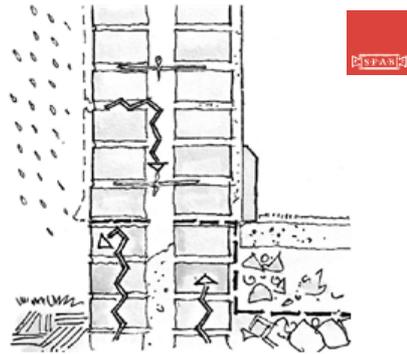


Traditional buildings are usually built of flexible and absorbent materials like stone, brick, timber and earth (cob or wattle and daub) held together with earth or lime-based mortars. The sheer mass of the wall gives a building its ‘weatherproofing’. The absorbent materials allow water to penetrate the fabric and then evaporate away harmlessly when conditions are favourable. It is for this reason that traditional buildings are said to be ‘breathable’. They rely on natural ventilation to control the internal environment and prevent condensation and mould growth etc...

In complete contrast, modern buildings (cavity wall construction) are designed to keep moisture out of buildings. Inflexible, ‘waterproof’ materials such as hard bricks, cement-based mortars and renders, modern masonry paints, external sealants etc... are used, with a physical break (cavity) to prevent moisture transferring to the inside of building. These buildings rely on mechanical extraction and physical ventilation to control the internal environment and prevent condensation and mould growth etc... As long as the building is maintained this method is effective, but if moisture is allowed to penetrate it will struggle to escape/evaporate and problems will occur. This why using modern methods on traditional buildings can cause problems. If you change the way a building functions, how moisture is or isn’t allowed to move through and escape from it, water will become trapped, leading to problems with damp internally. Try to work with your building rather than against it.



Traditional Mass Wall Construction



Modern Cavity Wall with damp proof course and floor membrane

Different Construction Techniques

Why Do We Need to Think About Maintenance?

- Places of worship are very important to people - we maintain our buildings to ensure that the fabric and the contents are given the best possible level of care.
- Maintenance and Mission – a well maintained church is more likely to draw interest from people than a badly maintained church. People will judge an organisation/community based upon aesthetics and the ‘feeling’ they get from a place.
- Prevent large repair bills- maintenance is the most practical and economic form of building preservation. By carrying out basic maintenance, the expense of major repairs can often be avoided and at the least postponed.
- Value for money - modest expenditure on repairs keeps a building weathertight, and routine maintenance (especially roof repairs and the regular clearance of gutters and downpipes) can prevent much more expensive work becoming necessary at a later date.
- Easier to fund - setting aside a small amount of money each year for maintenance tasks such as cleaning gutters and rainwater pipes and unblocking drains, is easier than raising funds to tackle major repairs caused by a leaking roof.
- Energy efficiency – a well maintained building is more energy efficient than one with leaking roofs, draughts and damp, so maintenance is actually the easiest way to cut your church’s carbon footprint.

A stitch in time saves nine.

Why Do Buildings Decay?

Poor construction and/or poor-quality materials

- Some construction materials are better quality and longer lasting than others i.e. granite lasts longer than clunch (chalk).
- Not all old buildings were ‘well built’ in the first place - very old buildings may not have foundations.
- The nature of some materials makes them more difficult to use i.e. rounded flints can drop out quite easily. Bricks that are on the edge of the kiln will be softer fired than those in the centre.
- Some materials have inherent problems i.e. iron cramps used to secure stone will eventually rust and cause damage.

Inappropriate repairs or wrong choice of materials

- Wrongly specified materials i.e. cement pointing instead of lime mortar - the cement is too hard and restricts breathability.

- The wrong approach to dealing with damp i.e. a chemically injected DPC may make the problem worse rather than better or may be unnecessary.
- The use of ‘wonder products’ i.e. products which claim to be miracle cures have turned out to be problematic such as silicone waterproofing solutions for masonry.

Plants and animals

- Trees and plants need to be controlled to prevent them growing too big and causing damage, such as roots getting embedded into mortar joints and/or undermining wall foundations.
- Animals can be a problem - bird droppings, damage by squirrels etc...

Weather and the environment

- Weathering and erosion are common due to the ravages of the weather in this country.
- Soot deposits are common particularly on urban buildings.
- Poor detailing can allow water to penetrate building or encourage plant growth.



Neglect or vandalism

- Blocked rainwater pipes and gullies.
- Peeling paint.
- Plants growing where they shouldn't.
- Lack of ventilation.
- Broken windows.
- Stolen lead and lightning protection systems.
- Graffiti.



Section Two: Managing Maintenance



Record Keeping

Planning is an important part of maintenance and it will save you time and money in the long run. As a general rule, you should have the following documents readily available and kept up to date.

- Calendar
- Logbook
- Baseline Survey
- Maintenance Plan
- Quinquennial Inspection Report

Calendar

A basic calendar which reminds you of the key tasks required each month, is useful to have on display in an office, vestry or kitchen, but not in the main public areas of a church.

SPAB's Faith in Maintenance calendar (pictured at beginning of section) can be downloaded via the Diocese of Ely's website or via the link in Section Five.

Logbook

Logbooks are often overlooked but they are a valuable resource in recording what work has been done in the church. This information can be vital in understanding problems, finding solutions and planning repairs. Keep the following in your church building logbook:

- Dates and details of all inspections and work carried out.
- Notes about any defects and how they were remedied.
- Relevant information such as measured plans; historical and archaeological assessments; fire, disaster and salvage plans; health and safety files; security and access plans; reports by specialist conservators; periodic reports on service installations; operating instructions; and routine maintenance records.

The Baseline Survey Form

Churchwardens are obliged to carry out an annual inspection of their church buildings, ideally in the Spring or Autumn. This should be methodical and comprehensive, with photographs taken and notes made about what you see.

To help with this, SPAB created a Baseline Survey Form during their Maintenance Cooperatives Project. The form looks more complicated than it actually is; most of the questions can be answered with a simple 'Yes, No or N/A (not applicable) or N/V (not visible)'. There are separate sections for the different parts of the building and outside area and the form, an excel spreadsheet, can be adapted to suit your building. The template and full instructions can be downloaded on the Diocese of Ely's website or via the links in Section Five. If you need any assistance in completing the form, please contact the Church Buildings Team at the Diocese of Ely.



Maintenance Plan

The Baseline Survey can be used to update your maintenance plan which can also include some minor repairs such as fixing slipped tiles and small areas of re-pointing. This plan identifies the key tasks that need to be completed, when they should be done, frequency and who is responsible for completing them. These can be split into three or four sections:

- Tasks that can be completed by volunteers
- Tasks that can be organised by volunteers but require a contractor to complete
- Task that need to be completed by a contractor but require professional input/advice from your architect or surveyor
- Tasks that require input from your architect/surveyor as part of a larger programme of repairs

Remember, some maintenance tasks and minor repairs will require consent. Read the guidance on List A, List B and Faculty or contact the Church Buildings Team – see details in Section Five.

There are many different templates available for a maintenance plan, some more complex than others. What you use is entirely dependent on your church building and the skills of your team. We recommend that you consider using one the template listed in Section Five.

The plan doesn't have to be limited to fabric works, it can also include cleaning and gardening, in fact it is a good idea to have one comprehensive plan as many tasks can be linked.

Quinquennial Inspections Reports

A thorough inspection of your church building, carried out by an appropriately qualified architect or building surveyor, is required every 5 years. This report will provide a schedule of recommended works in order of priority.

- It is important that you understand the contents of this report. The reports can often be lengthy with a great amount of information to absorb; it is, therefore, a good idea to ask your architect or surveyor to walk round the building with you to highlight problem areas.
- Use their recommendations to draw up a budget for any recommended repairs. If necessary, seek further advice on implementing those repairs.
- Try not to rely solely on quinquennial inspections as much can change in the intervening years. The system works best if you supplement the formal inspection with informal annual inspections as previously mentioned.

Who Should Carry Out the Work?

Historic buildings are at their most vulnerable where work is carried out without any professional involvement. Building contractors may not have specialist conservation knowledge, thus you might need your architect/surveyor to oversee work. It is good practice to consult with your architect when planning works. Maintenance contractors need to be particularly skilled individuals as their work encompasses a range of different disciplines and requires a robust approach to health and safety. To identify suitable contractors, find out who other churches in your area use, including non-Anglican buildings, other denominations and buildings managed by Trusts such as The Churches Conservation Trust. You can also use Maintenance Booker, a service provided by the National Churches Trust.

Some maintenance and repair tasks might need input from a professional conservator. ICON (Institute of Conservation) provides some excellent advice relating to the care of objects and working with conservators, it also has an accreditation scheme and manages a register to help you identify professional support.

Tasks Organised by Volunteers



These are going to principally be maintenance and monitoring works, which can be organised and/or undertaken by volunteers. They fall into three categories of occasional, regular (annual/monthly) and cyclical tasks.

Occasional tasks should be monitoring tasks such as inspecting roof areas and rainwater goods after stormy weather; or monitoring areas of damp internally.

Regular tasks should be allocated an appropriate month of the year, taking into account who will be carrying out the task. At the same time other tasks such as inspecting and carrying out minor repairs to roof coverings, can also be done.

Cyclical tasks such as decoration of windows or rainwater goods or testing of the electrical installation should be programmed over the period your maintenance plan.

Tasks Requiring Professional Input

These are likely to be major items of fabric repair that have already been picked up in your Quinquennial report and will need professional input. In the first instance your findings should be discussed with your professional advisor and/or committee dealing with the building fabric.

Works that will require professional input will include movement and structural issues and decaying masonry. Initial professional guidance might also be sort for matters such as damp walls, loose or missing pointing, timber decay and beetle infestation. Some non-skilled monitoring of issues such as beetle infestation, dampness and structural movement can be carried out by volunteers.

Plan and Budget for Tasks

When you have identified regular and cyclical tasks, working out which will require contractors and/or input from your architect, you will be able to create a maintenance budget. It is also a good idea to look back at work that has been carried out over last ten years (this is where a logbook helps). Not only will this help to shape your annual maintenance budget, it can also give you an indication of the costs and frequency of larger repairs which can help in establishing a fabric fund. It can also really help you to plan and deliver fundraising activities, including applying for grants.

Using Local Resources

Try to make full use of skills and resources within the local community, not just regular church goers – those who value the church building for other reasons.

- Set up a working party for simple, straightforward tasks. Reward volunteers with tea and cakes!
- 'Maintenance days' can be popular at churches to help with lower level work. They can also raise the profile of a church and teach people about the value of maintenance on all buildings. Reward your participants with, you guessed it, tea and cakes!
- Consider starting a 'Friends' group – they might be able to help with maintenance tasks and/or fundraising and may again draw in interest from the wider community, visitors etc...
- Organise a fundraising event during National Maintenance Week.

Section Three: What to Look For

RAINWATER GOODS AND DRAINS

The best time to inspect your rainwater goods is during or immediately after heavy rain as this will let you identify any problem areas easily. Use a pair of binoculars to help you see what is happening at gutter level and a hand mirror to look behind downpipes.

Gutters and downpipes should be cleaned regularly, at least twice a year preferably in spring and autumn after blossom and leaf fall. Gutters and pipes can become blocked by pigeon droppings and twigs from nests as well as dead pigeons, so if you have perching pigeons you will need to check your gutters more frequently, similarly if the church is surrounded by trees you should make more regular checks.

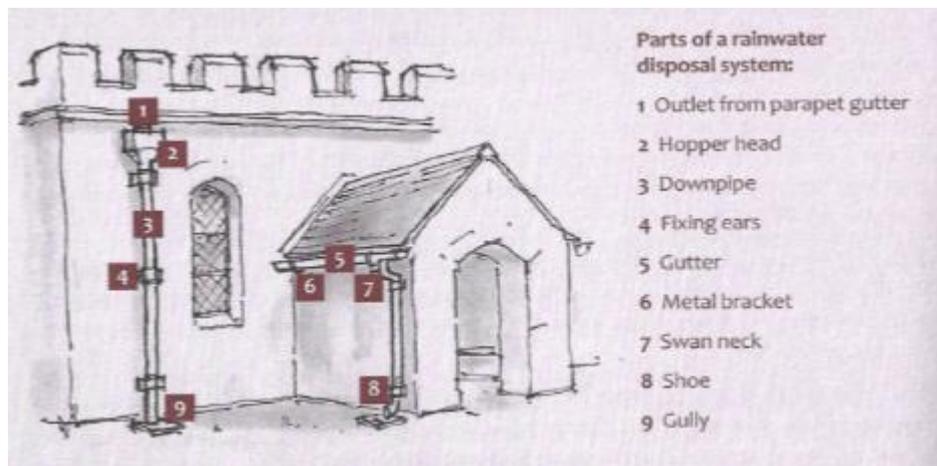


Illustration by James Innerdale

Gutters

To check your gutters, start at the downpipe and look along the gutter. Even if the gutter is clear drop a small pebble down the downpipe to check that it is not blocked.

- Check that eaves gutters are not broken and have not been damaged by frost.
- Check that gutters slope the right way. Signs of washed soil or splashes of soil on the base of the walls can be an indication that the water is not being caught by the gutter.
- Check for dripping sections on a dry day – this indicates that there may be a blockage.

Gutters should be cleaned using soft brushes and wooden or plastic shovels or trowels; metal tools can cause damage. Wear thick gloves and place the debris into a bag or bucket, which should be securely attached to your ladder. Debris should be disposed of safely, remembering that leaves can be added to the compost heap.

Roof valleys and parapet gutters: valley gutters are one of the most vulnerable parts of the building especially when they are hidden from view. Blocked valley gutters can lead to very serious problems with the roof fabric. Seeds blown by the wind can quickly establish themselves in small amounts of silt. Grasses and plants can then grow and their roots can cause extensive damage to masonry as well as impeding the flow of water away from the building. In cold weather, water which is unable to drain away will freeze, causing damage to the fabric of the building when it expands.

- Remove leaves, pigeon droppings and other debris to ensure a free flow of storm water and to prevent overflowing.
- During the winter, parapet and valley gutters also need to be cleared of snow to prevent melt water rising above them and causing damp internally. Even if safe access to valleys and parapets can normally be obtained, extra caution is needed under icy conditions.
- Use wooden or plastic tools for snow clearance to avoid damage to leadwork.
- If you cannot access valley or parapet gutters safely yourself, employ a contractor to do the work for you.

Downpipes carry the water from the gutter to the base of the walls and hopefully, away from the building; they need to be well maintained or water will saturate the wall behind causing internal dampness and staining. Most places of worship will have cast iron downpipes or perhaps lead, both materials are long lasting but need to be looked after.

Check for:

- Staining or algae around joints (visible when the weather is dry) as this is a clue that the connection may be faulty/blockage.
- Broken or missing sections of downpipe.
- Loose or corroded fixings.
- Splits at back – use hand mirror.
- Think about the need for repainting. Expect to have to repaint cast iron rainwater goods every 5 years.
- Fit bird/leaf guards to the tops of rainwater pipes and soil pipes to help prevent blockages. These need to be maintained and checked regularly or they will cause problems.
- Associated damp or efflorescence internally.

Gulleys catch the water from the downpipes and direct it away from the building. They need to be regularly cleared out to prevent them blocking and overflowing, saturating the base of the wall. This can lead to problems with internal dampness and if left unchecked, more significant structural problems caused by undermining of the footings or foundations. There are different types of gulleys – establish which you have and how they work (ask your architect or building surveyor).

- Trapped gulleys should have water in them in the same way that there is water in the bottom of a toilet bowl. If there is no water this might indicate that there is a crack at the base of the gully, allowing water to drain into the ground near to the foundations where it can cause damage.
- Dry gulleys should be investigated and replaced if found to be broken.
- Gulleys should be cleaned out regularly and any silt and debris removed to ensure that water drains away freely.
- If a drain is blocked a backlog of water may appear at the gully or the gully may clear very slowly.
- If a blockage is suspected the drains should be rodded to ensure they are working properly – a simple set of drainage rods can be purchased from DIY and hardware stores.
- Wear heavy rubber gloves and take care, as it is not unusual to find hypodermic needles.

Needles are a hazard as they may carry infection and should be treated with extreme caution. Many local authorities operate specialist services with a member of staff to deal with needle finds and specialist hazardous waste companies will collect and dispose of sharps bins routinely or by appointment.

Soakaways are a way of dispersing surface water where it is not possible to make a connection to the public sewer system. Many older soakaways are little more than a hole in the ground filled with bricks or gravel. Modern ones are usually empty chambers constructed from prefabricated units. Soakaways don't generally require much maintenance, but their effectiveness can decrease if there is a build-up of silt. It is a good idea to lift the cover and check for silting every few months or so. Any build-up of silt can be removed during dry conditions when the soakaway is empty.

Foul and combined drains: Foul drains carry the waste (grey) water from sinks and toilets to the public sewer. If this wastewater or effluent is mixed in with the surface water, it is called a combined system. A yearly inspection of all the accessible drains, manholes, inspection chambers and outlets is advisable. If you suspect a blockage you may be able to clear it using drain rods, otherwise seek professional help.

Water butts are a good way of saving water to use in the churchyard or garden, but make sure there is a way to deal with overflow. Excess water should not simply be allowed to run onto the ground where it can cause damage to foundations. Ensure that plant growth doesn't build up around water butts as this can cause damp and damage to masonry.

Ground levels: high ground levels can encourage dampness in the walls and care should be taken to prevent earth building up against the wall bases. Ideally, external ground levels should be at least fifteen centimetres (six inches) below the internal floor level. In the case of older buildings, where the ground levels have risen considerably as a result of burials, action to reduce the levels may not be possible. Archaeological advice should be obtained before any ground is disturbed.

Ground levels at some places of worship were lowered in the early C20. This has led to other problems in terms of access for maintenance and safety risks!

ROOFS

All roofs should be checked to ensure that they are in good order. Neglect of a faulty roof will quickly lead to damage in other building elements. If damp patches are apparent inside, they are not necessarily an indication of where the roof failure is located as water can penetrate over considerable distances before it is seen. Not all roof deformities indicate a problem with the structure underneath, but changes to the roof line should be reported to your professional adviser.



Drone Images of Woodston Church by UAV Film Company

Clay tiles, natural slate and stone are laid in overlapping courses so at any one place on the roof there are two if not three layers of material keeping out the weather. If one or two slates or tiles slip, the roof is still protected but try to have dislodged or missing slates and tiles reinstated as soon as possible. Tingles (slate ties) are a short-term solution.

- In particular, check your roofs for frost, snow and wind damage after stormy weather. Not all colour changes, minor cracks or delamination (flaking slates) mean that the roof is in poor repair, but debris on the ground from broken slates and tiles might indicate a problem.

- Look out for large areas of moss which can harbour damp and cause slates and tiles to deteriorate. If moss growth is a problem, it can be carefully removed by a knowledgeable contractor.
- Avoid bitumen coatings and spray-on foam - these hinder proper inspections, prevent the re-use of slates or tiles and, by reducing ventilation, increase the risk of timber decay.

Sheet metal roofing: Flat roofs and roof gutters should have a slight fall to let water drain away.

- Check for splits and cracks in areas of flat or sloping sheet roofing as these will let in water even if the defect is only small. Mastic or repair tapes can be used as an emergency fix until a proper repair can be carried out.
- Splits and pinholes in lead can usually be repaired by burning in a new piece of lead, but this type of work requires an experienced contractor, who will take the necessary fire precautions.
- Lead is easier to repair in-situ than other metals and is also generally longer lasting. Copper is less easy to patch repair and often whole bays need to be replaced if there is a problem.

Thatch: Seek the advice of a skilled and experienced thatcher for any repairs, overlays or re-covering. Do not worry if the roof looks patchy after repairs as they will soon blend in. If you think moss might be a problem, seek the advice of a thatcher as you may do more harm than good trying to remove it yourself. What you can do is consider fire prevention:

- Keep the roof-space draught free and clear of sawdust and old thatch.
- Ensure that any electrical wiring in roof spaces is checked regularly by a qualified technician.
- Spray on chemicals designed to increase fire resistance are **not** recommended.

Asphalt: bituminous compounds have been used to cover roofs for at least 150 years. Failures are usually caused by poor workmanship or design. Faults can sometimes be corrected if there is found to be a leak, however, it is not necessarily the case that all unsightly faults such as blisters or bumps need immediate attention.

Flashings: the most vulnerable areas of the building fabric often occur where one part of the building meets another. These junctions will often have lead or zinc flashings to protect the joint from the weather. Inspect these flashings to check they have not slipped or become damaged (holes or splits). Sometimes a mortar is used to protect these junctions which will eventually fail and drop out due to the exposed location. Check these areas carefully.

Lightning Protection Systems: fires arising from lightning strikes can be minimised by ensuring that the lightning protection is always in working order. It is important to implement a regular testing regime – ask your insurer for advice. The continuity of the conductors can be broken during building repairs or ground excavations. If lightning conductors are disturbed, they should be repaired immediately.

Flagpoles: Check that the flagpole is secure and that the fixings are in good condition and free from rust. If the flagpole penetrates the roof covering, check that there is a flashing in place to help protect the junction from the weather.

Towers and Steeples: the external faces are best left to a specialist to inspect and maintain. You can use binoculars to examine your tower or steeple from ground level. Speak to your architect about the possibility of having a tall tower or steeple inspected by a steeplejack every five years.

MORTARS

Traditional mortars are generally lime based and are softer than modern cement mortars, which can be extremely dense and impenetrable. Lime mortars are breathable – the mortar is of greater porosity than the masonry allowing moisture to evaporate through the joints rather than through the masonry units. Lime mortar is therefore sacrificial – it is cheaper to re-point it than to replace the stone or brick.

Cement mortars: Joseph Aspdin developed ‘Portland’ cement which he patented in 1824 (lime mortar was still commonly used into the 1920s and beyond in some areas).

Cement mortars are designed to be impervious and will crack if there is any movement in the structure. Cracks will allow rain to penetrate the wall where it can become trapped and may promote decay. If the cement mortar is harder and more impervious than the stone or brick the water will tend to evaporate



Hard cement pointing has caused the soft stone to decay

through the masonry leading to its premature decay through freeze thaw action and salt crystallisation at the surface of the stone or brick. In essence the stone or brick becomes sacrificial (see image left).

Flint Walls: as flint is almost impervious, the need for breathable / porous lime mortar is even more important. If the wall is pointed up in cement mortar and moisture gets behind this through cracks, it will not be able to evaporate through the flint and will be trapped behind, eventually blowing the flint face off.

Re-pointing: Aesthetic Issues

The appearance of brickwork and stonemasonry is easily disfigured by the wrong type of pointing. We should 'read' the brickwork or stonework of a building, not the pointing. Old pointing needs to be very carefully removed by hand to avoid damage to the edges of the bricks or stones. Traditionally lime mortar is flush pointed or even 'battered' over the surface. Ribbon or strap pointing is a recent style and is not appropriate.

WALLS



Structural issues: It is unlikely that you will discover significant structural defects when carrying out routine maintenance, but you do have a key role to play in monitoring changes. Note down the position of any existing cracks, bulges etc... in your logbook; photographs can really help with identification. Take advice from your architect or surveyor if monitoring is required and notify them of any significant changes. This also applies to cracks that have recently been repointed and continue to widen.

It is important to remember that some movement is normal and seasonal. Many historic buildings have survived for centuries without foundations and any associated problems, so it is reasonable to assume that they are now at ease with their surroundings. Problems generally result from the ingress of water, unchecked growth of nearby trees and changes in soil moisture. What impact climate change will have with longer periods of dry weather and heavier downpours of rain is uncertain.

Masonry: Problems with masonry (brick, limestone, sandstone, granite or flint) can generally be linked to issues with rainwater goods, loss of detailing such as string courses, inappropriate mortars and pollution.

Architectural features such as string courses, cornices and hood moulds above windows and doors are designed to throw water clear of the face of the wall. Pay close attention to the condition of these features as any damage will cause water to run down the face of the wall increasing the rate of decay.

Check the condition of mortar in joints and note areas where it is deeply recessed, friable (very crumbly), loose or missing. Get advice on repointing from your architect or surveyor as using the wrong type of mortar mix can do more harm than good (see MORTARS).

Pollution can affect that appearance of buildings in urban areas, but cleaning is usually inadvisable; consult your architect or surveyor if you have any concerns.

Render: Traditional renders are generally based on a mix of lime and sand. This makes them softer and more porous than modern cement renders, which can be extremely dense and impermeable. Lime renders are also more flexible than cement renders which will crack if there is any movement in the structure. Cement renders on traditional buildings can cause decay to the fabric underneath by reducing 'breathability' and trapping water. Removing it, however, can do even more harm.

- Never replace traditional renders with modern alternatives.
- Monitor cracks and areas of missing render and report to your architect or surveyor.

Plants: Plants can enhance the appearance of buildings, but they can also cause problems. Seek advice from your architect and the DAC before planting anything new and about the control or removal of trees or climbers. Roots from large plants, particularly trees and climbers, can damage walls and block gutters.

- Ivy can force joints open and damage the core of a solid masonry wall. Even small plants can cause considerable harm as their roots force their way between bricks and stones. At the base of a wall, plants can stop masonry from drying out and block ventilation bricks or air grilles.
- Keep the base of walls, in particular ground gutters or drainage channels free from plants. Removal by hand is best; ivy should be cut just above ground level and carefully detached from the masonry once the plant has died.
- Avoid using chemical weed killers as they can penetrate masonry and lead to problems of efflorescence.

TIMBER

Problems with timber are usually caused by dampness, which can lead to fungal infestation and wood-boring insect damage. Softwoods are particularly vulnerable and need to be painted to protect them from decay.

If you suspect timber decay or possible insect infestation, consult your architect or surveyor rather than someone with a vested interest in a method of treatment. Eliminating the cause of the damp may deal with or enable you to control the outbreak without significant expenditure.

The most common forms of beetle infestation are Common Furniture Beetle and Death Watch Beetle.

There are two types of timber rot – all are fungi. Wet rot is the most common; dry rot is less common. There is only one dry rot fungus (*Serpula lacrymans*). The spores are present in almost every environment, however, it will only take hold, germinate and spread if the environmental conditions are favourable i.e. damp.

DOORS AND WINDOWS



There is no need to assume that a damaged door or window will automatically need to be replaced. Most historic doors and windows can be adequately repaired at far less cost. Timber door and windowsills are especially vulnerable; cracks or open joints may need to be filled to prevent water getting in and causing rot. Decayed sections of timber can often be cut away and replaced with new matching timber by a skilled carpenter or joiner.

Check the condition of any paintwork as any blistered or flaking paint will allow water to penetrate which can lead to decay.

Doors

Many churches have fantastic old doors which need to be carefully looked after, however, timber is vulnerable and may deteriorate more quickly than other parts of the building.

It should be possible to open and close a door easily, without using any force. Worn or badly fitting hinges can damage both the door and the frame. Check to see whether the door has warped or deformed due to joint failure. Problems like these can be put right by an experienced joiner.

Make sure that any metal coverings and flashings are in a good condition above large doors and porches.

Leaded windows

Lead windows are fairly robust, but they still need to be checked regularly, using binoculars if they are high up. The repair of leaded windows is likely to require an experienced glazier, so report any damage or deformed areas to your architect or surveyor.

- Check the glass for broken or cracked panes.

- Inspect the lead comes (H-shaped strips of lead that make up the lead matrix), glazing putty and wire ties for signs of damage.
- If the glass and the lead appear to be buckled and deformed this might indicate that the lead framework has deteriorated.
- Clear away any dirt from condensation drainage channels and holes at the base of windows.
- If you have them, make sure the hopper windows work - leaded windows often have a panel that pivots horizontally to open inwards allowing the building to be ventilated.

Glass

Historic glass is very important and is increasingly rare. Clear glass can often go unnoticed, yet its imperfections can greatly add to the character of a buildings. In many cases this glass is irreplaceable, so any broken panes should not be discarded and cracked panes should not necessarily be replaced. If you have any concerns about old glass, including painted and stained glass, seek advice from a specialist glazier.

Ironwork

Check the condition of the ferramenta (the structural metalwork that supports the glazing). Rusting ferramenta will expand and can cause the surrounding stonework to crack and split, so it is important that they are kept in good condition. The repair of ferramenta are likely to require an experienced glazier.

Condensation and Mould Growth

Condensation is a process by which water vapour in the air cools and turns into liquid. Water droplets will appear inside buildings when warm, damp air comes into contact with cold surfaces such as windows, cold corners, the roof, floor voids and in cupboards.

Condensation is distinct from other forms of dampness, such as rain penetration and rising damp, which require different solutions. Mould growth is usually associated with condensation. Good ventilation can help to reduce the amount of condensation, so it is important to:

- Open windows to ventilate the church on dry days during the summer.
- Open windows and doors after a service or event, for a short time, but do close them before leaving unless it is a dry day and you can leave windows open. People create a lot of water vapour through breathing, talking, singing etc... and other activities such as boiling kettles and urns can also greatly increase the amount of moisture in the air. If this moisture is not removed it will condense on cold surfaces and may encourage damp and mould growth.
- Try to avoid using bottle gas heaters as they throw out a lot of water vapour into the air as part of the combustion process.

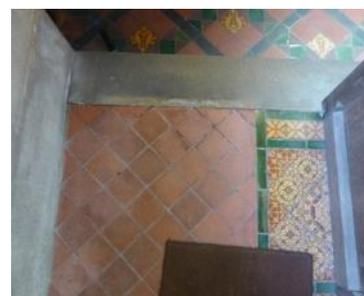
Dehumidifiers have their place but should only be used with windows and doors closed and the bucket should be emptied as soon as it is full, otherwise the water may re-evaporate. Ideally any dehumidifier should be vented externally.

INTERNAL

Floors and Ground Moisture

Traditional flagged or brick floors are laid on earth or lime and sand allowing the ground moisture to evaporate up through the joints. This is different to modern construction that combines a damp-proof membrane in the floor, linked to a damp-proof membrane in the base of the wall to control rising ground moisture. As with walls, if you use a modern material on the top of a traditional one, you will change the way moisture evaporates – the ‘breathability’ – leading water to become trapped and cause decay.

If a solid impervious floor is introduced into an historic building, the ground moisture will be pushed to the base of the walls leading to problems with rising damp where there is not a damp-proof course.



Damp proof courses: a requirement for DPCs was enacted in 1875, but it is still common to find buildings without any form of DPC as late as 1913. DPCs could be made from lead, pitch, asphalt and slate.

- Check to see if there is a slate or bitumen DPC (unlikely pre-late C19th).
- Do not seal stone or brick floors with wax or oil.
- Do not cover historic floors, including ledger stones and brasses, with rubber or foam backed carpet or mats.
- Check for signs of damage and excessive wear.
- If you notice problems with rising damp, first check to see if you have any leaking drains and gutters as this could be the cause rather than the flooring.

Air bricks and timber floors

Victorian places of worship and C19 extensions/alterations may have air bricks in the external walls. Air bricks ventilate the voids under suspended timber floors or pew platforms. If they become blocked there will be less air movement under the floor which may eventually encourage rot in the floor joists and floorboards.

Make sure that any airbricks or ventilators in the base of the wall are free from obstruction and clean them if necessary. A thin stick is useful for this purpose.



Towers and Spires

If possible, check the condition of any ladders in the tower and make sure that handrails and lighting are in working order.

Clear away any debris and droppings left by birds, but always take appropriate precautions such as wearing gloves, safety goggles and a face mask. If deposits are substantial call in a specialist cleaning team.

Make sure that roofs and other high areas are bird-proofed before the nesting season in March but take care not to disturb bats. Wire mesh is generally better than netting and lasts longer. Remember that ventilation is important so avoid blocking areas. Seek advice from your architect or surveyor.

Bells and Bell frames

Check that the bell chamber, bells and bell frame are in a good condition and working satisfactorily (this might be a job for the Tower Captain). Consider implementing a maintenance plan specific to these areas.

Clocks

It is a good idea to have just one person responsible for the maintenance of a clock, even if a rota of people wind it. This person should have some mechanical knowledge and should be able to carry out safety checks as well as lubricate the moving parts and remove dirt and surplus oil. All other work should be left to a specialist craftsman.



Roof Spaces

Only inspect roof spaces if there is a safe means of access and a boarded floor, otherwise leave to a professional. The key things to check for are any signs of leaks or water damage especially below gutters and that there is good ventilation.

Ceilings

Check ceilings or the underside of roof spaces regular using binoculars. If you observe new stains, considering carrying out an inspection of the roof coverings. This might have to be done by a professional depending upon access and safety.

Internal Walls

If you identify any new stains or damp patches, try to identify the cause. Internal damp can often be linked to faulty rainwater goods, raised ground levels, use of modern materials like cement renders, cracks in masonry or failed roof coverings. If no obvious cause is found consult your architect or surveyor, avoid a remedial company with a vested interest in selling their own remedies; the cause must be identified first and

a solution appropriate to the building and environment implemented. Use of modern methods can cause more harm than good.

Avoid using modern paints on historic walls as they are made from plastics and will trap moisture. Ask your architect or surveyor on what is best for internal decoration.

Plumbing

Overflows, dripping taps and leaks should be fixed immediately to prevent water from getting into nearby timber or masonry.

Electrical Systems

These should be checked by a qualified electrician at least once every five years. This person must be enrolled with the National Inspection Council for Electrical Installation Contracting (NICEIC) or Electrical Contractors Association (ECA). In addition, an annual routine inspection should be carried out by someone who is competent to understand the electrical system, noting wear and deterioration, missing parts, labelling and operation of test buttons. Details must be recorded in the logbook.

Portable Electrical Equipment

Small electrical fittings such as portable heaters, kettles and fans are frequent causes of fires. It is therefore advisable to ensure that any such appliances and their connecting flexes are regularly inspected and replaced if faulty.

The commissioning of Portable Appliance Testing (PAT testing) is unlikely to be necessary in most church buildings but you must put in place a system of annual inspection by a competent person. They should be looking for frayed flexes, smoke blackening, faulty switches, over worked extension leads etc... Remember to check the electrical wiring and equipment connected to organs too.

Extension leads should never be used on a permanent basis and never run cables under carpets where they may be damaged or overheat.

Guidance can be found on the HSE website.

Heating Systems

- Ensure that all exposed tanks and heating pipes are protected against frost and that the frost thermostat is working.
- Shut down the system once a year and have it serviced.
- Bleed radiators.
- Gas appliances should be inspected by a qualified (Gas Safe) engineer on a regular basis.
- Consider changing over bulbs to LEDs as this reduces cost and reduces risk associated with changing bulbs at high level.

Fire Safety

You must take reasonable steps to guard against fire. The government has produced a set of guides to tell you what you have to do to comply with fire safety law, to help you to carry out a fire risk assessment and identify the general fire precautions you need to have in place.

Flammable Materials

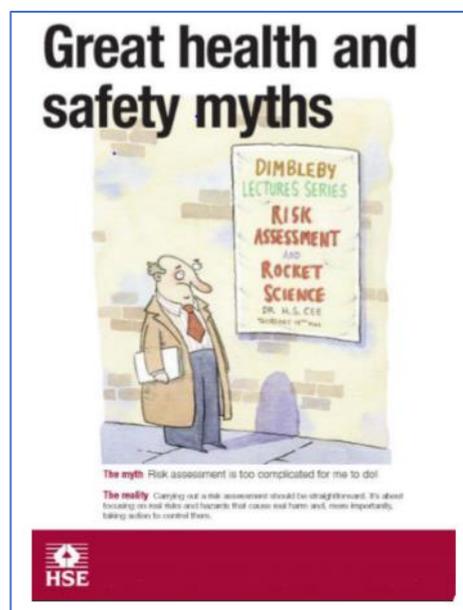
- Try to ensure that unwanted equipment and materials are regularly removed from the buildings as piles of paper and fabric etc... can be a potential source of fuel for a fire.
- Highly flammable items such as gas bottles for portable heaters should never be stored inside the building, they should be kept in a secure outdoor enclosure.
- Cans of petrol or other fuel for mowers should never be stored on site.
- Cleaning materials and polishes can also be a hazard. Store only the minimum amounts necessary on the premises in a safe and secure place.
- Think carefully about how and when candles are used.

Fire Safety Equipment

- Fire safety equipment such as fire blankets, extinguishers, door closers etc... should be provided where necessary and kept in good order.

- The existing equipment should be visually checked weekly or monthly depending on how often the building is used to ensure that each item of equipment is in the right place and has not been used or damaged. It is advisable to maintain a written record of these inspections.
- Professional inspections should be carried out at recommended intervals by a qualified contractor (preferably approved under the British Approvals for Fire Equipment scheme) and their advice followed. Inspections are usually carried out annually.
- Think about whether you need to provide training in when and how to use fire safety equipment. This should be covered in your fire risk assessment.
- Ensure your fire safety risk assessment is up to date and understand your evacuation procedure.
- Regularly test smoke alarms and change batteries if applicable
- Ensure your lightning conductor is regularly inspected – insurance companies may have different requirements for this so do check, but a general rule is once every year.

Section Four: Health and Safety



Risk Assessments

A risk assessment is nothing more than a careful examination of the hazards you might encounter. Before undertaking an inspection or carrying out routine maintenance tasks you must assess whether there are any hazards present (e.g. difficulty of access, slippery surfaces, fragile materials or hazardous substances) and the risk they pose.

A risk assessment should be a practical exercise, aimed at putting the right checks in place. The best advice is to keep it simple but make sure that you put your findings into practice.

As part of the risk assessment you need to think about how to get access to places where you need to carry out inspection or maintenance tasks safely. This may include discussions with your architect or surveyor about providing additional handrails or works to address uneven steps.

Be Prepared!

- Always ensure that someone else is aware of what you are doing and where you will be. If possible don't work alone.
- The most important thing to remember is that no person should take on any task they do not feel competent or physically able to perform.

- If in any doubt about safe access, particularly on roofs and in attics, use a reputable, professional builder for inspection or work.

Before starting any task make sure that you have the correct equipment:

- It is generally sensible to wear old clothes and an overall or boiler suit when tackling cleaning or maintenance.
- Good stout non-slip footwear is also recommended and boots with steel toe caps may be advisable.
- Sturdy gloves will be needed when cleaning out gutters and rainwater pipes and heavy-duty rubber gloves when dealing with drains.
- Safety goggles or glasses are also useful to prevent dirt and grit irritating the eyes.
- If you are working in dusty situations or where there are pigeon droppings or similar a good quality face mask is also necessary.
- You might also find a safety helmet or 'hard hat' useful as these provide some protection against knocks when working in spaces with low headroom such as roof spaces.
- You may wish to have a torch and your mobile phone with you too.

Working at Height

The major issue with respect to safety whilst carrying out maintenance tasks is working at height. On average thirteen people a year die as a result of a fall at work and nearly 1200 suffer major injuries. More than a quarter of falls happen from ladders.

The Health and Safety Executive (HSE) advises that ladders can be used for some types of work if the use of more suitable work equipment (such as tower scaffolds or mobile elevating work platforms) is not justified because of the low risk and short duration. In this case a short duration is taken to be between 15 and 30 minutes depending upon the task. Ladders can also be used for low risk work where there are features on the site that mean there is no other alternative.

“If it’s right to use a ladder, use the right ladder, use it safely”.

As a general rule, a tradesperson should be asked to carry out all inspections or work that requires working from ladders above one storey in height. For more information on working at height and using ladders visit the HSE website.

Roofs

- Be careful on flat roofs especially where the parapet may not be very high. Stay away from the edge as far as practicable.
- Slates and tiles will often have a thin and very slippery film of moss and moisture especially after wet weather or during the winter.
- Lead roofs and gutters can be slippery all year round where they are permanently in the shade. Take extra care in icy conditions.
- In strong sunlight all surfaces can become exceedingly hot to the touch. Take care before placing a hand on such materials for support.
- It is also possible to cause a great deal of damage to metal roof or to slates and tiles by walking on them – suitable footwear and a high degree of care is required.

Harmful Materials

Birds and Droppings

Bird droppings can make walking surfaces hazardous, particularly in wet weather. They may also disguise patches of rotten flooring if they are allowed to accumulate to any degree.

There is a potential risk of disease from direct contact with birds and their droppings. Pigeons can carry a number of potentially infectious diseases such as salmonella, tuberculosis and ornithosis (a mild form of psittacosis with pneumonia-like symptoms). Pigeons are also a source of allergens, which can cause respiratory ailments like pigeon fancier's lung and allergic skin reaction. There is potential for these illnesses

to be spread to people through contact with pigeon droppings; dandruff and feathers; pigeon parasites; or where dead infected pigeons get into food or water sources.

Small amounts of pigeon droppings may be removed with care. Heavy duty rubber gloves, a face mask and goggles will be necessary. Wash your hands thoroughly afterwards. If there are more substantial deposits a specialist contractor with the appropriate equipment should be engaged.

Seek advice on how to prevent the entry of birds from your professional advisor. Pigeons can be deterred from using common perching and roosting sites such as window ledges and roofs by fitting stainless steel wires, barrier gel, spikes and use of falcons twice a year.

Asbestos

A great many buildings still contain asbestos, but it is not easy to tell whether any asbestos which is present is likely to be harmful or not. The Control of Asbestos Regulations 2006 - Regulation 4 introduced a new 'duty to manage' asbestos. This means that asbestos needs to be identified and strategies for dealing with the associated risks put in place.

Organise for an Asbestos survey to be carried out at your church and keep it readily to hand. Contractors should ask to see sight of the report in advance of any works.

Treat all suspected asbestos products with caution and do not disturb them. The removal of asbestos is a task for trained personnel. Advice on the relevant legislation and how to deal with asbestos can be obtained from the HSE website.

Fire Safety, Heating and Electrical Services – see Section Three

Other Hazards

Confined spaces can be any space of an enclosed nature where there is a risk of death or serious injury from hazardous substances or dangerous conditions (e.g. lack of oxygen). Some confined spaces are fairly easy to identify, e.g. enclosures with limited openings but others may be less obvious e.g. open-topped chambers or unventilated or poorly ventilated rooms.

You need to think about:

- Making sure you have sufficient lighting
- Ensuring that there is adequate ventilation.
- Whether there may be harmful materials, insects or rodents present.

Awkward access – historic buildings, particularly churches, inevitably have areas that are difficult to access due to their age and the way that they were built. Thinking about ways of improving access is always worthwhile. Options may include new ladders or better access points.

Slips and trips are the most common of workplace hazards and make up over a third of all major injuries. Keeping areas where people walk free from obstructions, debris and misplaced items. Make sure that floor surfaces are kept in good condition with no holes or unevenness.

Bats



Bats are protected under law. If bats are disturbed during works, work **has to stop**.

Minor works can usually be undertaken without a bat survey. For routine work such as re-plastering and timber treatment, seek advice from a bat roost volunteer. More extensive works are likely to require a bat survey and a licence from Natural England.

Having bats will not prevent work from taking place, it just means you will need to avoid disturbance during winter hibernation and summer maternity roosts.

Having bats can sometimes feel like a real burden rather than a blessing due to the need for constant cleaning and the disruption to work. The Bats in Churches projects is exploring ways to address this to ensure both people and bats can live and work in harmony. Find out more by visiting the project's website.

Section Five: Additional Resources and Support

Documents

Baseline Survey Template and Guidance:

<https://www.spab.org.uk/content/baseline-survey-template>

Glossary:

Short: <https://www.spab.org.uk/sites/default/files/MCP%20Glossary.pdf>

Detailed: <http://www.lookingatbuildings.org.uk/glossary/introduction.html>

Maintenance Calendar: <https://www.spab.org.uk/sites/default/files/SPAB-FiM-maintenance-calendar.pdf>

Maintenance Template: <https://www.nationalchurchestrust.org/regular-maintenance/maintenance-checklists-and-plans>

Further Support

Diocese of Ely - Church Buildings Team

<https://www.elydiocese.org/parish-support/church-buildings/>

General Contact: 01353 652729 or via dac@elydiocese.org

Team Contacts – <https://www.elydiocese.org/parish-support/church-buildings/contact-the-team/>

ICON (Institute of Conservation)

<https://icon.org.uk/>

<https://www.conservationregister.com/>

National Churches Trust

Maintenance Booker: <https://www.maintenancebooker.org.uk/>

Maintenance and repair grants: <https://www.nationalchurchestrust.org/our-grants>

SPAB Technical Helpline - Monday to Friday 9.30am until 12.30pm on 0207 456 0913:

Free advice on ALL your maintenance and repair queries.

Access to SPAB's database of professionals, craftspeople and contractors.

Sources of further information and guidance.

Information

HSE

Portable electrical equipment - www.hse.gov.uk/electricity/information/public.htm

Working from height - <https://www.hse.gov.uk/work-at-height/using-ladders-safely.htm>

Asbestos - www.hse.gov.uk/asbestos

Fire Safety: <https://www.gov.uk/government/publications/fire-safety-risk-assessment-small-and-medium-places-of-assembly>

Bats

Bats in Churches project - <https://batsinchurches.org.uk/>

Churchcare guidance notes: <https://www.churchofengland.org/more/church-resources/churchcare/advice-and-guidance-church-buildings/bats-churches>

Other

SPAB National Maintenance Week: <https://www.spab.org.uk/campaigning/national-maintenance-week>

SPAB Regional Volunteer Groups: <https://www.spab.org.uk/members/regional-groups>