

The principles that will be discussed as part of this session apply as much to our smaller simply rural places of worship as they to more significant churches and cathedrals.



## We will attempt to answer four main questions:

- •What is maintenance?
- •Why do buildings decay?
- •Why is maintenance important? •What should we look for?

## What is Maintenance?

"Put Protection in the place of Restoration, **to stave off decay by daily care,** to prop a perilous wall or mend a leaky roof...

... thus only can we protect our ancient buildings, and hand them down instructive and venerable to those that come after us."

SPAB Manifesto 1877 ~

William Morris



to Gancal

SPAB Maintenance Co-operative Project

#### Preserve our heritage for future generations

•When William Morris set up the SPAB in 1877 he argued that we should *"stave off decay by daily care"*.

•By doing this we would be able to "protect our ancient buildings, and hand them down instructive and venerable to those that come after us".

•Historic buildings are some of the most important physical representations of who we are and the things that we have achieved as a nation.

•They contain some of our most beautiful and most precious works of art.

•If we preserve our inheritance we can pass it on to future generations.



#### What is maintenance?

All buildings start to decay as soon as they are complete.

Maintenance is therefore simply a way of slowing 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.



#### Why do we need to think about maintenance?

•Quote from PPS5 on why the historic environment is important.

•Particularly relevant to churches and places of worship that have been central to the national, local and community identity for in some cases up to 500 to 600 years.

•They are living breathing illustrations of our history.

•Places of worship are also very important to people so essentially we maintain our buildings to ensure that the fabric and the contents are given the best possible level of care.



#### 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.

•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.

•Set aside a small amount of money each year for maintenance tasks such as cleaning gutters and rainwater pipes and unblocking drains - a little yearly investment might mean that you don't have to raise funds to tackle major repairs caused by a leaking roof.

•A stitch in time saves nine.



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

•A lot of these problems 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.



# 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 builders were well built in the first place - very old buildings may not have foundations.

•The nature of some materials makes then more difficult to use i.e. rounded flints can drop out quite easily.

•Some materials have inherent problems i.e. iron cramps used to secure stone will eventually rust and cause damage.



## Why do buildings decay? Time and environmental factors

•All natural materials will start to break down through the natural process of aging. Nothing lasts forever!

•Prolonged exposure to acid rain can start to dissolve some limestones and will also corrode metal ties and fastenings.

•Industrial pollution can cause a crust of salts to form on a surface accelerating decay.

•Driving rain can penetrate deep into solid walls where the pointing is missing or decayed.

•Frost can also contribute to decay as the surfaces of old bricks and tiles can shatter if water freezes and expands in their pores.

•Animals can be a problem – bird droppings, damage by squirrels etc.

## Why do buildings decay? Inappropriate repairs or wrong choice of materials





# Why do buildings decay? Inappropriate repairs or wrong choice of materials

•Well intentioned but inappropriate work i.e. a waterproof surface coating painted over soft sandstone in an attempt to protect it. More harm than good.

•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.



## Why do buildings decay? 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.



## **Rainwater Goods**

•We start with rainwater goods because these are, without doubt, the most important element of the building. If your rainwater goods are working well there is a good chance that the rest of the fabric will remain in good condition.

•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.

## Gutters

•Use a pair of binoculars to help you see what is happening at gutter level.

•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.

•Start at the rainwater pipe and look along the gutter.

•Even if the gutter is clear drop a small pebble down the rainwater pipe to check that it is not blocked.

•You must clear leaves and debris from gutters and rainwater pipes regularly.

•Gutters should be cleaned using soft brushes and wooden or plastic shovels or trowels as 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. Once established grass and plant 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. This should be done at least twice a year in spring and autumn. During heavy leaf fall it is worth removing dead leaves on a weekly basis

•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.

•Be aware that north facing flat roofs and gutters can be very slippery all year round.

•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.



## Gulleys

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 gulley, 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 – buy drain rods.

•Wear heavy rubber gloves and take care, as it is not unusual to find hypodermic needles.



## **Downpipes**

Downpipes carry the water from the gutter to the base of the walls and hopefully away from the buildings and need to be well maintained or water will saturate the wall behind and lead to internal dampness and staining. Most places or 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.

·Associated damp or efflorescence internally



#### Plants

•Plants may enhance the appearance of buildings, but consider seeking advice about the control or removal of trees or climbers if there is evidence that they are damaging walls or blocking gutters.

•Tree roots can disrupt foundations

•Climbing plants, such as mature ivy, can be strong enough to force rainwater pipes away from the wall if allowed to grow behind them. Ivy can force joints open and also damage the cores of solid masonry walls. Hinders maintenance of wall behind and will destroy integrity or mortar.

Take care to clear away plant growth from around the base of the walls of the church and in particular from the drainage channel. The roots of plants and grasses can damage the integrity of the channel and impair its ability to carry water swiftly away from the building.



## Roofs

•All roofs should be checked to ensure that they are in good order.

•Neglect of a faulty roof will guickly 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.

#### Clay tiles, natural slate and stone

•Tiles and slates 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.

•<u>BUT</u> try to have dislodged or missing slates and tiles reinstated before damage occurs to roof timbers or plaster ceilings. Tingles are a short-term solution.

•In particular check your roofs for frost, snow and wind damage after stormy weather.

•Not all minor cracks or de-lamination (flaking slates) mean that the roof is in poor repair but debris on the ground from broken slates and tiles might indicate a problem.

•Avoid bitumen coatings and spray-on foam. These hinder proper inspection, prevent the re-use of slates or tiles and, by reducing ventilation, increase the risk of timber decay.

•Not all roof deformities indicate a problem with the structure underneath but changes to the rook line should be reported to your professional adviser.

•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.

•Junctions are often pointed with mortar which will eventually fail and drop out due to the exposed location. Check these areas carefully.

•Alternatively junctions might be protected by lead or zinc flashings. Check that these have not slipped or become damaged.



## 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 repair 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.

## Asphalt

Bituminous compounds have been used to cover roofs for at least 150 years. Failures are usually caused by poor workmanship or design and 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.



## Traditional mass wall construction (left)

Built with soft, 'breathable', flexible materials.

Relies on the mass of the wall for 'weatherproofing'.

Absorbs moisture and allows quick evaporation or natural drying.

Relies on natural ventilation to control the internal environment and prevent condensation and mould growth etc.

## Modern cavity wall construction (right)

Built with hard, impervious and inflexible materials.

Relies on 'waterproof' materials.

Physical break (cavity) required to prevent moisture transferring to the inside of building.

Relies on mechanical extraction and physical ventilation to control the internal environment and prevent condensation and mould growth etc.

Problems occur when two systems are mixed with impervious materials preventing the wall from 'breathing' and drying out, trapping moisture within the wall, leading to problems with damp internally.



## **Repointing – Technical issues**

## **Traditional 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 greate 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 than to replace 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 through the masonry leading to its premature decay through freeze thaw action and salt crystalisation at the surface of the stone or brick.





#### Тор

Brick wall with weather back sacraficial lime mortar that can be re-pointed

## Bottom

Soft stone walls pointed in hard cement mortar preventing the evaporation of moisture through the joint leading to decay of the masonry.

#### **Re-pointing – Aesthetic issues**

•The appearance of brickwork and stonemasonry is easily disfigured by the wrong type of pointing.

•With buildings we should 'read' the brickwork or stonework, 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 'buttered' over the surface. Ribbon or strap pointing is a recent style and is not appropriate.



## **Entrapped Moisture**

Unnecessary damage caused by a lack of understanding of how traditional building construction works.

Extreme example of what can happen when is moisture entrapped within the body of a wall. An earth based structure with a hard cement render, which when a section what carefully removed for investigation resulted in the collapse of the wall.



## **Rising Damp**

Traditional porous flagged floors are laid on an earth or sand base allowing the evaporation of ground moisture to occur through the floor.

If a solid impervious floor is introduced the ground moisture is then pushed to the base of the walls leading to problems with rising damp where there is not a damp proof course (dpm).

## Check for:

•The presence of a slate or bitumen dpm.(Unlikely pre late C19th)

•Leaking drains and gutters in areas of localised rising damp as this may be caused by water discharging into the ground and can be easily remedied.

## 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. They could be made from lead, pitch, asphalt and slate.



## 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.



## Left

The traditional appearance of the inside of a church with lime plastered walls and limewash finish to the walls, columns and window surrounds, giving an integrity to the interior.

## Right

'Monuments on a sea of crazy paving' - a church interior with the plasterwork removed from the walls revealing rubble stonework not intended to be seen when the church was first built. The C19th aesthetic of Victorian Gothick.

This falsifying of the character of many churches in late C19th lead the likes of William Morris, Philip Webb and others to form the SPAB in 1877.



## Condensation and mould growth

•Condensation is the release of water that occurs when air is cooled to its 'dewpoint' temperature and can carry less moisture as vapour. Water may condense indoors as warm, damp air comes into contact with colder building components, particularly where ventilation is poor – for example, in room corners, roof or floor voids and 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 rather than damp within the body of the wall.

## **Bottled Gas Heaters**

•Bottle gas heaters should be avoided as they throw out a lot of water vapour into the air as part of the combustion process, leading to potential problems with condensation and mould growth.

## Dehumidifiers

•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.



## **Entrapped Moisture and Timber Decay**

Moisture entrapped with the body of the wall can also cause problem with decay of any timbers embedded in the wall such as lintels or fixings for panelling etc.

•This can take the form of fungal decay of beetle infestation or both. If an attack is suspected it is first important to identify the extent and cause as eliminating the cause of the damp may deal with or enable you to control the outbreak without significant expenditure.

•If you suspect that there is timber decay seek advice from your architect or surveyor, rather than someone with a vested interest in a method of treatment. It is usually possible to treat problems sympathetically.



## **Beetle Infestation**

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

•Most infestations should first be monitored to determine the extent of any live infestation. Most can be controlled by controlling the environment – eliminating the sources of damp and introducing ventilation.

•Wholesale treatment with chemical preparations is rarely necessary but independent advice from a timber specialist (rather than a treatment company) may be required.



## **Timber decay**

•There are two types of rot – all are fungi. Wet rot is the most common; dry rot is less common.

•There is only one dry rot fungus (Serpula lacrymans) and 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.

•If you suspect that there is timber decay seek advice from your architect or surveyor, rather than someone with a vested interest in a method of treatment. It is usually possible to treat problems sympathetically.

•Wholesale timber treatment with chemical preparations is rarely necessary but independent advice from a timber specialist (rather than a treatment company) may be required.

•Most rots can be controlled by controlling the environment – eliminating the sources of damp and introducing ventilation.



#### **Doors and Windows**

•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.

•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 window cills 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.



## Ventilation

•Some ventilation in historic buildings is important, but this does not need to be a howling gale and should be controlled.

•Make sure that you can open window and hoppers so that you can ventilate the church on dry days during the summer.

•After a service there is a lot of water vapour in the air – this is produced by the people in the church and needs to be removed.

•If it is not removed it will condense on cold surfaces and may encourage damp and mould growth.



#### Ironwork

•You should also note 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.



t im.)

## Summary

• Good maintenance is about spotting problems before they become too serious and taking early action to rectify them.

• You can carry out practical tasks such as cleaning gutters and unblocking air bricks to keep the building safe and dry.

• Take advice from your architect or surveyor if there are any matters of concern.

#### But remember that...

• You may need to apply for permission to carry out repairs – check what rules apply to you before you start work.

• The fabric of the building is important in archaeological terms – sometimes quite minor and seemingly harmless work can destroy archaeological evidence.

SPAB Maintenance Co-operative Project

#### Summary

•Good maintenance is about spotting problems before they become too serious and taking action to rectify them.

•You can also do practical things such as cleaning gutters and unblocking air bricks.

•Take advice from your architect or surveyor if there are any matters of concern.

## But remember that...

•For some works of maintenance and repair you may also need to apply for permission from the body responsible for regulating works to your place of worship e.g. if you belong to an Anglican parish church you may need to apply for a faculty. In most cases it is sensible to check what rules apply to you before you start work.

•The fabric of the building is important in archaeological terms. Sometimes quite minor and seemingly harmless work can destroy archaeological evidence. This applies to the parts of the building both above and below ground.



## **Risk Assessment**

•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 is nothing more than a careful examination of the hazards you might encounter.

•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. If you have any doubts as to whether you can carry out a task safely – **DON'T DO IT** – seek further guidance or employ a reputable tradesperson or professional.





## Stay Safe ~ the Key Message

•The key point to remember is that if you have any doubts as to whether you can carry out a task safely – **DON'T DO IT!** 

•Seek further guidance or employ a reputable tradesperson if in doubt.

•For specialist tasks such as those concerning electrical or heating services always engage a fully qualified professional.



## **Baseline Survey checklist and Maintenance Plan**

- Will help you explore the building inside and out.
- · Simple to use and complete without the need for specialist knowledge
- · Intended to complement the Quinquennial survey
- Aims to identify the main maintenance issues from which you can develop a Maintenance Plan



#### **Baseline Survey checklist and Maintenance Plan**

• The MCP has developed a Baseline Survey checklist that is designed to help you better understand maintenance and fabric issues at you place of worship.

•It is simple to use and complete without the need for specialist knowledge.

•It is intended to be used as an annual checklist to help with regular maintenance issues and allow you to more readily monitor issues you may have with damp, cracking, beetle attack etc.

•It is intended to complement the Quinquennial Survey

• Its aim is to identify the main maintenance issues from which you can develop a Maintenance Plan.

•Templates for the Baseline Survey Checklist and Maintenance Plans will be available on the MCP website at http://www.spabmcp.org.uk/

•The MCP project can offer free training to help you with the Baseline Survey and development of Maintenance Plans.

