

War Memorials in Wales Technical Guidance



Llywodraeth Cymru
Welsh Government

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CARING FOR



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War Memorials Trust is a national charity which works for the conservation and protection of war memorials in the UK.

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The content is based on *Advice on Maintenance of War Memorials* (English Heritage and War Memorials Trust) and *Short Guide 3: The Repair and Maintenance of War Memorials* (Historic Scotland and War Memorials Trust).

These documents can be accessed from the War Memorials Trust website.
www.warmemorials.org/a-z

This publication is available in alternative formats. For details please contact Cadw at the above address or telephone 01443 336000.

Cover photograph: The weary face of war, Lampeter.

Contents photograph: The Royal Welch Fusiliers memorial, Wrexham.



Caring for War Memorials in Wales

Technical Guidance



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XX
HONOURED MEMORY OF
THE MEN OF THIS DISTRICT
WHO FELL IN THE
GREAT WAR, 1914-1919.

CAPT. M.K.A. LLOYD. GR. GEN. COS.

LT. R.B. DAVIES. R.F.C.

LT. D. JONES. S.W.B.

CPL. LL. EVANS. W.H.

CPL. T.S. HAVARD. W.C.

DVR. H.A. CLOAKE. R.F.A.

DVR. J.G. GRIFFITHS. R.F.A.

GR. D. LEWIS. R.F.A.

SIGR. E.W. DAVIES. W. REG.

"GWELL ANGEU NA CHYWILYDD."

Pvt. J.H. THOMAS. YORK. REG.

Pvt. D. LEWIS. W.C.

Pvt. J. THOMAS. RES. B.T.

Pvt. D.E. JONES. CAN. REG.

W.O. T. JAMES. R.N.S. MERRISTON

Sgt. D. DAVIES. E.H.

SIGR. J.E. THOMAS. R.H.

Pvt. J.A. JONES. R.W.F.

"EU HADERTH NID A VEIBIO."

1939 - 1945

PTE. D.C.R. BRANFIELD. B.W.

O.S. J. EVANS. M.H.

FLY SGT. J.M. JONES. R.A.F.

A/C. T. JONES. R.A.F.

W.O. J.I. REES. R.A.F.



Introduction

War memorials continue to be a focal point in towns and villages throughout Wales for commemorating two world wars and other conflicts. It is important that these memorials are properly maintained and conserved for the benefit of future generations. This technical guidance explains in detail how best to care for war memorials in Wales. It is intended mainly for custodians to help them identify what maintenance work can be done by non-specialists, including volunteers, and when they should seek professional help with specialist maintenance or remedial work. In general, any specialists or contractors should have experience of working with historic structures. Specialist contractors and conservators may also find the guidance useful.

The companion publication, *Caring for War Memorials in Wales*, explains the special interest of war memorials in Wales and provides a general introduction to their maintenance for custodians, local authorities and local people interested in the conservation of this unique legacy.

The emphasis of both publications is on freestanding memorials and plaques rather than larger structures such as buildings or parks and gardens for example. War memorials may be statutorily protected by listing or scheduling so it is best to seek guidance from your local planning authority Conservation Officer before you begin any work to find out if any consents are required. There is more information about consents in *Caring for War Memorials in Wales*.

Below: War memorials are found in every part of Wales. They are a unique record of the impact of war and their long-term conservation ensures that the memory of those who lost their lives endures (By courtesy of Media Wales Ltd).

Opposite: This memorial at Aberbanc, near Llandysul, was erected to commemorate the First World War.





Repair and Maintenance

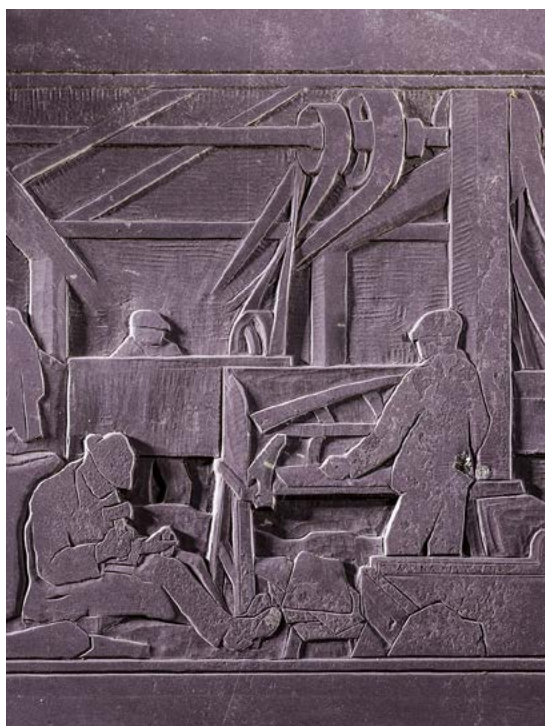
When planning works to a war memorial, it is important to have a clear understanding of the materials the memorial is made from and to understand the specific conservation requirements relevant to them.

This technical guidance looks at the different materials used for the construction of war memorials, the risk of damage caused by physical, biological or atmospheric agents and the appropriate care and maintenance necessary to ensure their long-term survival.

Specialist advice should be available from your local planning authority Conservation Officer and War Memorials Trust and there is a list of useful resources and contact details on page 29.

Stone

Sandstone, limestone and granite are the most common types of stone used for war memorials in Wales. Alongside other stone types, imported marble was occasionally used for sculptures and slate was sometimes used for roofing and inlaid panels with inscriptions.



Stone can vary widely in quality, appearance and durability. Where repairs are required, you may need to identify the source of the stone, either from records or by using a stone-matching service. Unlike granite, which is hard, other stones are softer and more porous and, therefore, more vulnerable to damage from inappropriate cleaning, poor detailing and weathering. Some types of stone can be prone to delamination, where layers flake away from the surface. This normally occurs when the stone has not been laid correctly with respect to its grain but can be a natural occurrence that cannot be prevented.

Granite was frequently used for war memorials even when it was not found locally. This may be because its durability and aesthetic qualities were considered particularly appropriate for war memorials. Granite has a crystalline structure which can take a high polish making it particularly suitable for interior memorials. External memorials may use a combination of finishes and were often left rustic deliberately. If appropriately treated, granite memorials can have a long lifespan and require relatively little maintenance. But, they can still be harmed by aggressive cleaning methods or the use of inappropriate repair materials.

Below left: Slate was sometimes used for carved panels like this at Capel Baladeulyn, Nantlle. The carved detail shows a scene from the lives of the slate workers.

Below right: Marble was often used for memorial panels inside places of worship and civic buildings. This poignant memorial is in Pendref Methodist Chapel, Denbigh.

Opposite: War memorials are often made of a number of different materials. Here, at Ebbw Vale, the bronze statue, the granite pedestal and pillars, and iron chain-link each has its own specific conservation requirements.



Below left: When properly maintained, stone is one of the most stable building materials and can be used for both building and decoration. Erected in 1919, the intricate carved sandstone head of the memorial at Hanmer has withstood almost 100 years of exposure to the elements.

Below right: Not all stone, however, survives well. The deterioration of the columns and inscription on the limestone memorial at Abercynon is likely to result from a number of different factors.

Conservation and repairs to stonework on war memorials should follow the principles of minimum intervention and maximum retention of original fabric. Cleaning, re-pointing, indent repairs or re-facing should only be considered where the condition or structural integrity of the memorial is compromised, or where the defects detract from its significance and status.

Historic structures often lean and usually this is not a problem or sign of structural instability. Unless it is clear that the memorial is at risk of collapse, you should monitor it to see whether or not movement is still active. Where there is a cause for concern, you should seek the advice of a suitably experienced conservation architect or structural engineer.

Stone decay

Stone is one of the most stable building materials when it is properly maintained providing that it has been correctly selected and bedded, and designed to shed water. However, over time all types of stone will erode and weather. The rate of decay depends on the type of stone and the level of exposure. Deterioration can also be affected by the way the stone has been dressed and laid, or by natural variations within individual pieces of masonry.

Common causes of damage to stone war memorials:

- atmospheric pollutants
- biological growths, made worse by cleaning or persistent damp conditions
- physical damage from wear, collisions, vandalism or theft
- chemical cleaning
- the use of hard, dense cement mortars for re-pointing and repair works
- abrasive cleaning techniques
- cracking from frost action or expansion of ironwork
- salt damage
- graffiti
- natural weathering and faults in the stone
- poor architectural design or detailing



Surface soiling

Atmospheric pollutants, such as soot and industrial chemicals, have been significantly reduced over recent years, but increasing vehicle emissions continue to be a common cause of stone soiling and decay in urban areas. Stone memorials may also be soiled and discoloured by both natural and artificial biological or chemical agents.

It is perfectly natural for a stone to gradually change colour from its pristine new state when it is exposed to the elements and develops a natural patina on its surface. The patina begins to form when the fresh stone is cut from the quarry. A thin crust is formed when soluble minerals are deposited on the surface as the stone dries out. The wetting and drying cycles caused by exposure to the weather continue the mineralogical changes near the stone surface which, combined with particulate matter in the atmosphere, develop into a stable surface zone, usually only a few millimetres thick. This patina acts as a protective layer and its removal by inappropriate cleaning methods can expose softer stone which deteriorates and decays. Patina also gives the stonework much of its character and can be appreciated as an indication of the memorial's permanence and endurance. The appearance of old stonework can be beautiful and stone should never be cleaned simply to refresh the appearance of the memorial. Generally, soiling is only a problem if it is causing damage to the fabric, spoils its appearance, makes it impossible to assess the condition of the memorial or to read the inscriptions.

Algae, lichens and mosses can be common on external stonework, especially in rural areas. Such growths are not necessarily harmful and may even improve how the memorial looks. However, biological growths may encourage soiling by providing a suitable surface for pollutants to stick to. If they are damaging the stone or obscuring inscriptions or decorative detail on a war memorial their removal may be desirable. Removal of biological growths may also be necessary to assess the surface. Some species are protected by law. More information on protected species is available from Natural Resources Wales www.naturalresourceswales.gov.uk.

Plant growth

Where sites are neglected or where fractures in stonework or pointing allow vegetation to grow, small plants and tree saplings can readily take a hold. Buddleia and ivy are common and can cause serious damage if not removed or controlled. Plants can bury roots within the joints or under the base of war memorials and cause fractures, jacking or instability.

In severe cases the memorial may have to be dismantled and rebuilt, but, usually, you can weed out the plants, remove the roots and get the voids re-pointed. Where the plants are well established, a biocide may be needed to kill off the root network and remove the rest of the plant, but care must be taken not to use biocide

War memorials often attract growths of algae, lichens and moss, which may require removal. Check if you need specialist help. The discoloration on this war memorial looks like an algal growth.



on the memorial itself. Application of a biocide should be undertaken by a specialist.

The best way to avoid plant growth is to make sure that the pointing is sound and to repair broken stone.

Moss

Moss will only grow where it is persistently damp and sheltered, so it may grow on memorials that are overshadowed by buildings or trees, or where heavy rainfall combines with poor drainage. Small amounts of moss are not harmful but in greater quantities it can cause deterioration of stonework or pointing. This is because moss retains moisture and may make the stone vulnerable to frost damage. Where moss is growing mainly along joints it normally means that the joints are open and trapping water, so this should be investigated.

Moss is not aggressive and you can easily remove it by gently scraping with a wooden spatula as part of your regular maintenance programme. You do not need a specialist unless the stone is in a poor condition. If it is, you should seek specialist advice to find out whether removal is appropriate or may cause damage. Biocides are not usually necessary and should be used by a specialist. However, some species of moss may be protected or be of regional importance. More information is available from Natural Resources Wales www.naturalresourceswales.gov.uk.

Algae

(use a specialist contractor)

The growth of algae on a stone surface is common and indicates water. Algal growths are usually green and slimy when fresh and change to black when the surface dries out. Algae may colonise a memorial in a very wet area, or where it is overshadowed by trees or buildings and remains damp for extended periods.

Most lichens — like the yellow growth on this plinth — are harmless but should be monitored.



You can reduce or prevent algae by reducing surface moisture. Organise the repair of architectural details to control run-off and the cutting back of sheltering vegetation to encourage quicker drying.

When dry, algae can be removed by brushing with a stiff natural bristle brush or scraping with a wooden spatula. Sometimes, additional cleaning with a non-ionic detergent may be required to remove any residue. In general, this type of work should be done by a contractor with appropriate experience.

Lichens

Lichens are a combined growth made up of fungi and algae. They are extremely slow growing and often a sign of a clean atmosphere. The subtle colours and mellowing effect of lichens on stonework can be very beautiful. Most lichens are harmless but there are some species which can damage the surface of vulnerable stone types by causing blistering or pitting.

As the removal of lichens can damage the stone, it is recommended that you remove it only when the stone is being harmed or where inscriptions are obscured. If this is the case, remove the lichens with a stiff natural bristle brush. For particularly hard lichens, a water saturated cotton cloth should be applied for a minimum of an hour before attempting to brush or scrape it off. When the stone is generally in good condition you do not need a specialist. However, if the stone is very old or in a poor condition you should consult a specialist.

Steam cleaning can also be effective and has the added benefit of a sterilising effect which delays re-growth. Steam cleaning should only be undertaken by a specialist contractor (see p. 10). Some species of lichen may be protected or be of regional importance. More information is available from Natural Resources Wales www.naturalresourceswales.gov.uk.

Use of biocides

(use a specialist contractor)

The application of a biocide may be specified for the removal of biological growths and after stone cleaning, but it should only be applied by a specialist contractor. Biocides are generally only effective for a short period of time unless the underlying reason for the growth has been

addressed. The dead growth that results from using biocide can also provide a nutrient layer on which new growth will re-establish itself at an accelerated rate.

Biocides with a neutral pH are preferable on stone memorials as natural stone can be affected by acid- or alkali-based products. However, cleaning stone structures may actually promote the development of biological growths, particularly algae. This may be due to the phosphates in some chemical cleaning agents, or the creation of a rougher surface on the cleaned stone to which plants can more easily attach. Therefore, biocides should only be used when necessary and the benefits outweigh the potential harm.

When a biocide is used — perhaps where extensive or persistent plant growth is present — the treatment must destroy the problem organism effectively without harming other flora and fauna in the vicinity, or entering water sources. It should not leave deposits on the stone, alter the natural colour of the stone or affect the stone in any permanent way that could lead to further deterioration. Any metal elements should be protected during the use of biocides.

Household bleaches, patio cleaners and weedkillers should not be used on war memorials. They often contain harsh chemicals and can deposit salts which cause further decay. There is specific guidance about *biocides and detergents* on the War Memorials Trust website.

Stone cleaning

Where soiling has a significant detrimental effect on stonework, either physically or aesthetically, it may be appropriate to clean the stone. Opinions vary on the appropriate appearance of war memorials: weathered or pristine. However, an aged surface should not be confused with soiling and any cleaning should conserve the existing patina.

Decorative elements and inscriptions in bronze or other materials should be carefully protected from damage during all cleaning processes. When stone cleaning is necessary, the least aggressive method should always be the starting point to minimise the risk of damage to the memorial. The success of all methods depends on the skill, experience and

equipment selection of the operator and the correct specification.

Although non-specialists, including volunteers, may be able to use some basic water cleaning methods on stone in good condition, most cleaning should be done by conservation specialists.

Trial panels

Before cleaning stone on any memorial, a small trial panel should be prepared in a discreet area to assess the impact of the cleaning method on the stonework, starting with the least aggressive and invasive method. On memorials made up of different stone types or where there is a variety of soiling, several trial panels may be necessary. Once the procedure and level of cleaning have been agreed, the trial panel should remain as a 'control' until the majority of the work has been completed. This can also help to avoid disputes.

The polished granite war memorial on Church Island, Menai Bridge, should be cleaned using appropriate techniques to preserve its character and the inscriptions.



Dry brushing

Manually brushing the stone with a natural bristle or nylon brush to remove organic growth and loosely bound surface dirt is a gentle and effective method of cleaning. It can be effective on rubble and rock-faced ashlar memorials. If the stone is in good condition you do not need a specialist to do this work. However, if the stone is friable even manual brushing can cause loss of surface detail. If you are uncertain about the condition of the stonework, you should consult a specialist. Wire brushing is not suitable for war memorials.

Low-pressure water washing

This is one of the least aggressive methods of cleaning stone. It is commonly used to clean stone where dirt is bound to relatively soluble chemical compounds. It is particularly effective on limestone and granite. More stubborn soiling can be softened with water and then removed with natural bristle brushes or a wooden scraper. Water washing can also be effective on marble, combined with a non-ionic detergent for more difficult or greasy deposits.

Water washing should only use enough water to wash away the deposits, or loosen them so they can be removed manually. Too much water can cause over-saturation or staining of the stone, particularly on marble. Begin cleaning at the top of the memorial to avoid washing dirt onto previously cleaned surfaces. Water washing

Steam cleaning can be effective to remove a surface build up of dirt, but a specialist contractor should be employed to do the work like that seen here at Pontarddulais (© Elliott Ryder Conservation).



should not be done in very cold weather as it will leave the stone vulnerable to frost attack. Basic water cleaning of relatively sound stone does not need a specialist contractor but you should consult a specialist if you plan to use more sophisticated methods.

Steam cleaning

(use a specialist contractor)

Steam cleaning is often used in conjunction with other methods such as bristle brushing or low-pressure abrasive cleaning. The steam loosens surface-bound dirt so that it swells and detaches. It is not suitable for the removal of carbon-based pollution deposits which are not generally water soluble and tend to penetrate the matrix of more porous stone. When used in conjunction with mild detergents, steam cleaning can be effective at removing grease and oil deposits. Newer proprietary steam-cleaning processes use pressurised, super-heated water directed onto the surface which softens surface deposits allowing easy removal. This process is effective at removing organic growth, paint and some types of graffiti and is particularly effective on limestone and granite. Steam cleaning should be undertaken by specialist contractors.

Low-pressure abrasive cleaning

(use a specialist contractor)

Proprietary low-pressure cleaning systems use a specialised nozzle that delivers water mixed with a very fine abrasive powder. The process tends to be less aggressive than other forms of pressure washing as the powder particles are very fine and applied in a vortex rather than directly onto the surface. This method can also be used without water to deliver a low-pressure abrasive clean and can be effective at removing pollution crusts, particularly from sandstone. It is essential that a skilled person does the cleaning to make sure that the memorial is not damaged. Used incorrectly, such methods can cause loss of definition to tooled finishes and roughening of the stone.

Abrasive cleaning

(avoid these methods)

There are other methods that are sometimes used for cleaning stone which are not suitable

for war memorials. These include dry or wet grit blasting, disc cleaning and high-pressure water washing. Such methods carry a high risk of damaging the surface of the masonry and joints, and cause further deterioration.

Chemical cleaning

(use a specialist contractor)

Many acid and alkaline chemical cleaning agents are available and they vary in strength and effectiveness. Detergents and biocides are sometimes added. Chemical cleaning is particularly damaging for porous stones, such as limestone and sandstone, and can cause severe staining on marble, but even very hard impermeable stones such as granite can be harmed. Chemicals can penetrate the stone resulting in efflorescence (salts) and decay over subsequent years. Often, chemical cleaning is combined with pressure washing to remove residues, which can cause further damage.

Because of the risks attached, chemical cleaning is not normally recommended for stone war memorials. In exceptional circumstances the use of chemical cleaners may be appropriate; for example, for some types of graffiti and severe staining on sandstone which are not soluble in water. Cleaning trials using different chemical strengths and concentrations are essential to establish the best option for the stone type. Acidic products should never be used on limestone and marble. Chemical cleaning should be undertaken by specialist conservators.

Poultices

(use a specialist contractor)

Some types of staining can penetrate the stone, such as staining caused by metal run-off, iron oxide (rust) or copper compounds from bronze and brass. Cleaning techniques, which act on the surface of the stone, will not be effective in these cases and a poultice is the best option.

Poultices are typically applications of fibrous or clayey materials containing water and/or other solvents. They work by drawing the stain out of the stonework. Poultices containing sequestering agents are available for the removal of metallic stains. Run-off staining from metal is normally a result of lack of maintenance of the protective coating (wax, paint or patination oils). If this coating is not maintained after cleaning, the

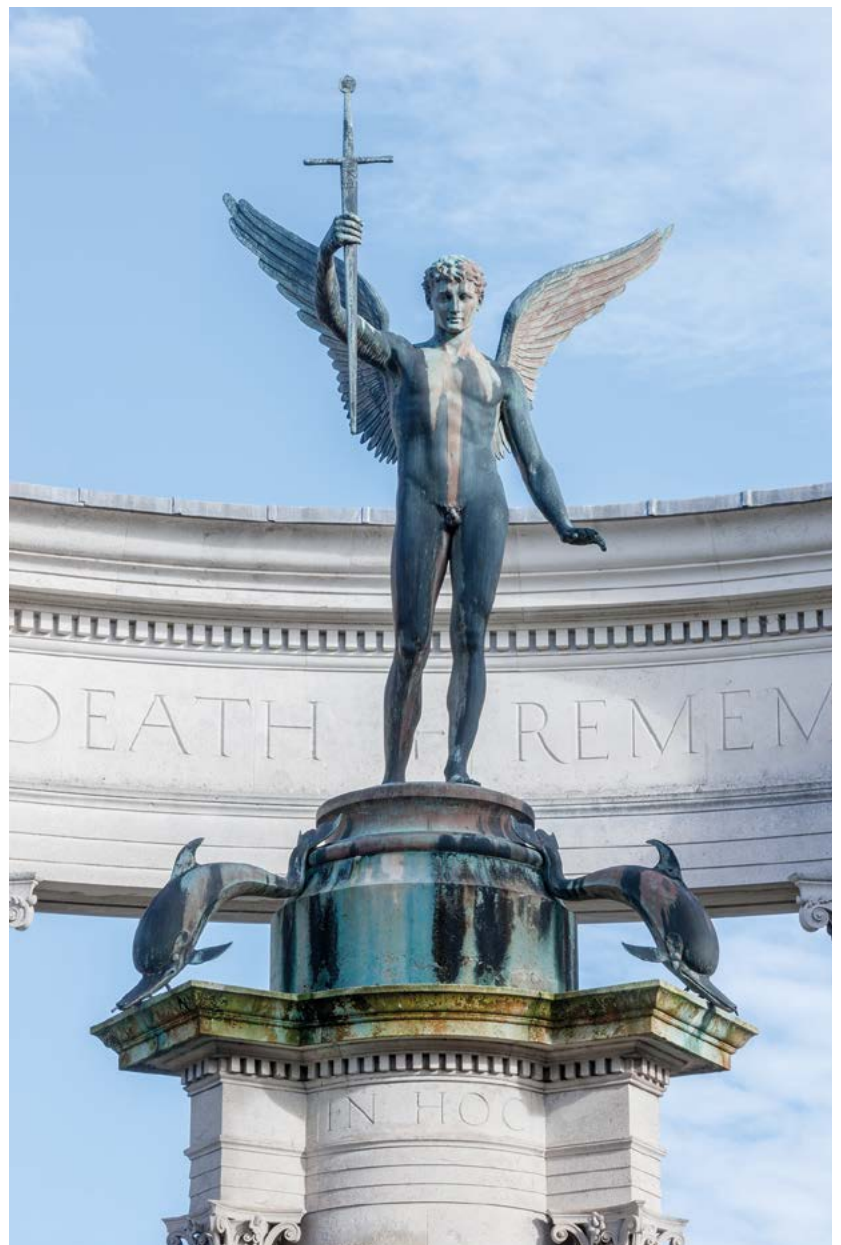
staining will re-appear. Cleaning using poultices should be undertaken by specialist conservators.

Re-pointing masonry

(use a specialist contractor)

It is important to make sure that pointing remains sound as defective joints can allow water to penetrate the memorial. Cycles of freezing and thawing can result in damage to the stonework. Defective pointing, which allows moisture retention, can also encourage biological growth and lead to further damage to the memorial. Re-pointing will be needed when the bedding or jointing mortar is washed out or loosened, leaving gaps that water can penetrate. Where pointing has deteriorated

The stonework here has been stained by metal run-off from the bronze statue above. A specialist conservator may use a poultice to remove the stain. A new protective coating for the statue should prevent further staining.





Re-pointing may be necessary to prevent water from penetrating stonework, but care must be taken to specify the correct mortar and style of pointing as seen here at Towyn.

very badly, stones may become loose and require re-setting.

In general, lime mortar is suitable to use with historic stone. Cement mortar can cause damage because it is inflexible and impermeable.

War memorials are important monuments and were often built from high-quality ashlar masonry with fine joints, or from coursed, squared and dressed stone. Re-pointing dressed stone requires a high level of skill as conventional methods and tools can easily damage the stone. You should seek contractors with suitable skill and experience but, before starting any re-pointing work, you should commission a detailed evaluation to determine the full extent of the work required and the specification of the mortar mix.

Re-pointing should only be done where the existing pointing is defective and there is evidence of, or a risk of, damage to the stonework. Slightly or partially eroded pointing is often still effective and over-zealous re-pointing may do more harm than good, both aesthetically and functionally. It is important to take photographs of the memorial before beginning any stone repair work to use as a reference for the repair and to avoid disputes over workmanship.

Decayed and loose mortar should be removed carefully using a thin steel hook or knife. If absolutely necessary, a skilled contractor can use an oscillating disc (not an angle grinder

or vibrating cutter) to cut out fine joints. But, as a rule of thumb, if a mortar needs a mechanical tool to remove it, it is unlikely to require replacement unless it is causing problems.

The joints should normally be raked out to a minimum depth of 25mm, or twice the width of the joint, whichever is greater. To ensure that all the loose and decayed mortar is removed, the joints should be carefully flushed out with water, taking care that the debris does not collect elsewhere on the memorial.

Specifying mortar for repairs

(use a specialist contractor)

Natural stone should not be re-pointed using cement-based mortars. These are normally too inflexible and impervious to allow thermal movement and vapour transfer. As granite is hard and dense, it suffers less from sacrificial weathering when a strong mortar is used compared with softer stones; however, the hardness of the stone is not the only aspect to consider when specifying a mortar.

When cement-based or other inflexible mortars are used with a hard stone, the structure cannot easily accommodate thermal movement. The stone resists cracking so that as the body of the structure expands and contracts with natural changes in temperature and humidity, the mortar joints will absorb the strain and may crack. Cracks in the mortar joints allow water to get into the structure. This can become trapped and lead to damage from frost and vegetation growth.

Lime mortars are more flexible and can accommodate movement more readily so there is less likelihood of cracking. Lime mortars also allow moisture to evaporate. A degree of permeability in the mortar joints is important even with very hard stones, as the only way moisture can move through the memorial is via the joints. For hard stones, such as granite, a stronger lime mortar can often be used without risking damage to the stone, but a high compressive strength or cement-based mortar is not necessary and may cause problems in the long term.

New mortar should match the colour and texture of the original mortar. Pointing should generally be finished flush or slightly recessed behind the face of the stone. It must not be overworked when it is first applied as this will bring the lime to the surface. Instead, it should be finished by brushing or tapping it with a stiff bristle brush once it has achieved its preliminary set. This will help to tighten the joints and expose the texture of the aggregate. Care should be taken to avoid smearing mortar over the face of the stone and any excess should be cleaned up immediately.

Lime mortar work is best avoided during very cold weather or on very warm, dry, or windy days. The fresh pointing should be protected from drying out too quickly by placing sheets of damp hessian against the stone face until the mortar is cured. In warm weather conditions, the hessian should be regularly

sprayed with a fine water mist. If the pointing is allowed to dry too rapidly it is likely to fail. Failed pointing is crumbly and may have a white 'bloom' of free lime on the surface. Where this occurs the pointing will have to be removed and re-done.

Re-pointing and the use of lime mortar are specialist skills and should be carried out by an experienced contractor who is aware of their functional and aesthetic impact.

Stone repairs

(use a specialist contractor)

Where an individual stone has decayed or been damaged to the point that it is causing a problem to the memorial, replacement may be considered. Alternatives, such as over-wintering boxes, should also be considered. This is a simple wooden box built to cover a memorial, which protects it from harsh weather during the winter months. It is a good idea to consult with the local community before covering a war memorial in this way.

Stone should not be renewed simply because it is weathered. Over time, all natural stone will weather and take on an established appearance. This is not a sign of decay and can contribute to the character of the war memorial, signifying its age and sense of timelessness.

Surface repairs

In some cases it may be possible to prolong the life of limestone by applying lime treatments



When stone replacement is essential, the new stone should be dressed to match the original. In this example from St Fagans, the top surface is smooth and the facing edge has been rusticated to match the stone alongside (© War Memorials Trust).



War memorials vulnerable to damage from passing traffic can be protected by bollards. The low bollards around the war memorial at Rhayader protect the monument, but pose little risk to traffic.

or carefully colour-matched lime shelter coats to form a sacrificial layer. These treatments can be particularly useful in extreme environments. However, shelter coats must be kept in good condition as they are not a permanent repair.

There are also several types of stone consolidant available, but these must be used with extreme care and only by an experienced stone conservator as choice of the wrong material or application can cause additional problems. Water repellents are generally best avoided as they can alter the colour of the surface or, worse still, trap moisture in the stone, causing the surface to spall through the action of freezing and thawing and the build up of salts.

Stone replacement

In some cases, partial stone indents may be specified so that as much original fabric as possible can be retained. When removing the damaged or decayed stone, care must be taken to ensure the surrounding stones are not chipped or damaged. Power tools should not normally be used as they significantly increase the risk of damage to surrounding stonework.

The exception to this is the careful use of an oscillating disc cutter by a skilled contractor for cutting out stone or joints. A sufficient depth of the decayed stonework should be removed in order to ensure that the replacement stone can be fitted securely into the space. This would normally be a minimum of 100mm. The new stone should be dressed to match the tooling on the original stone, but should not be artificially weathered or distressed to blend in with the surrounding stones. Over time, new stones will weather and blend in if they have been well matched and dressed.

If individual stones or sections of stonework are to be replaced, it is important to specify a correct match with both the geological properties and physical appearance of the stone. Indenting with incompatible stone may cause further problems in the future due to differential weathering, performance and appearance. Where possible, a stone sample should be analysed to identify the quarry it came from. Records may also show from where the stone was sourced. Where an exact match is not available, a conservation specialist should advise on appropriate alternative stone choices.

Where war memorials are vulnerable to impact damage, such as on a busy street, discreet bollards can provide some protection.



Eroding inscriptions

(use a specialist contractor)

Where names are illegible through erosion or damage, letters may need to be sharpened or re-cut. However, if this is likely to cause more damage to the memorial, or if the substrate is too delicate, then re-cutting the names on to a different part of the memorial or on a replacement panel may be more appropriate. Alternatively, it may be possible to record the names elsewhere. The solution will depend on the specific circumstances. If the inscription is the work of a notable artist it may be desirable to retain the original work and allow it to erode naturally and provide an alternative method of reinstating the list of names. A balance needs to be struck between conserving the memorial and ensuring that the list of names is preserved.

Plaques of different stone should not be added as they will affect the appearance of the memorial and may cause damage to the original stonework from differential weathering.

Concrete

(use a specialist contractor)

It is not unusual to find concrete as part of a war memorial. Often it was used for steps, bollards or other boundary elements. Sometimes the entire memorial may be concrete.

Concrete structures can be vulnerable to cracking caused by corrosion of ferrous fixings, freeze/thaw expansion or structural damage. Concrete structures can also be disfigured by staining caused by salt efflorescence or biological agents. Where concrete has developed cracks, it is important to identify the cause and, if possible, remedy this before attempting to repair the damage. This may involve cutting out ferrous fixings and replacing them with stainless steel equivalents, improving weathering details or repairing damaged or missing elements that are causing structural damage.

Cast concrete can be difficult to repair and repairs will often be visible. Obtaining a close match to the original mix in terms of strength, colour and texture will help minimise the visual impact. Unless the original specification is known from records, analysis of the concrete will probably be necessary to determine the most appropriate repair specification.

Analysis and repairs can be carried out by specialist materials consultants or conservators. Samples of the proposed mix should be produced to ensure a suitable match and to avoid disputes. Small cracks can sometimes be effectively repaired using a grout based on Ordinary Portland Cement (OPC) and fine mastic sand, various types of proprietary resins or lime mortar.

Left: The clarity of inscriptions is important, but cleaning or repair work should not damage the memorial. The lettering on the Blackwood war memorial is clearly cut and coloured.

Right: In contrast, the letters on this Portland Stone memorial are eroding. They may need to be re-cut eventually or the stone may need to be replaced if this is the cause of the deterioration rather than natural weathering (© War Memorials Trust).

Metal

The most frequently used metal in war memorials is bronze, but copper, brass, iron and lead elements are also found. In some cases gilding may be present. Repair methods to historic or artistic metalwork should always be chosen to minimise risk of damage to the material and to retain as much of the original as possible. The advice of a specialist should always be sought and, in most cases, work should be carried out by a metals conservator.

Bronze is a common feature of war memorials and was used for plaques and statues. These figures have weathered to a green streaky surface finish, which is probably unintentional.



Bronze

Bronze is an alloy of copper and tin. It is a very common feature of war memorials either as cast statues, which make up the whole memorial, or plaques or decorative panels. The surface of bronze statues was often treated to create a certain aesthetic effect. This is called patination and can be either natural or applied chemically. The patina can vary across the metal surface to accentuate certain features or to create optical highlights. Dark brown is the most common patination finish for war memorials and plaques (see p. 18). Sometimes, sculptures were treated with chemicals that hasten or simulate the corrosion process to create a variegated finish which was then stabilised using oils or wax. This could produce an antique appearance.

Raised letters on memorials were often polished to a sheen to highlight them.

After patination, a protective microcrystalline wax was applied to the bronze and this needs to be regularly re-applied by a specialist conservator to maintain the protective coating. 'Bronzing liquid' is not an appropriate finish for traditional bronze because it is the wrong colour, obscures detailing — particularly of the raised letters — and does not offer adequate protection to the metal.

Surface deterioration

(use a specialist contractor)

When bronze corrodes it leaves corrosion products on the surface. The deposits are normally copper compounds (carbonates and sulphates), which create the familiar green surface finish sometimes known as verdigris. Although the green colour is a result of corrosion, it is slow forming and stable and can be maintained as long as an appropriate protective wax is applied.

Where bronze has not been regularly re-waxed, the natural processes of weathering can accelerate corrosion and loss of the applied patina. This will lead to a change in appearance and, over time, the bronze may become vulnerable to damage and decay. Vehicle emissions and environmental pollution can accelerate the deterioration of bronze. Bronze exposed to a salty, marine environment is particularly vulnerable and bird droppings can also be highly corrosive.

Active corrosion, which appears as bright green pitting, powdering and pustules, should be treated urgently by a metals conservator.

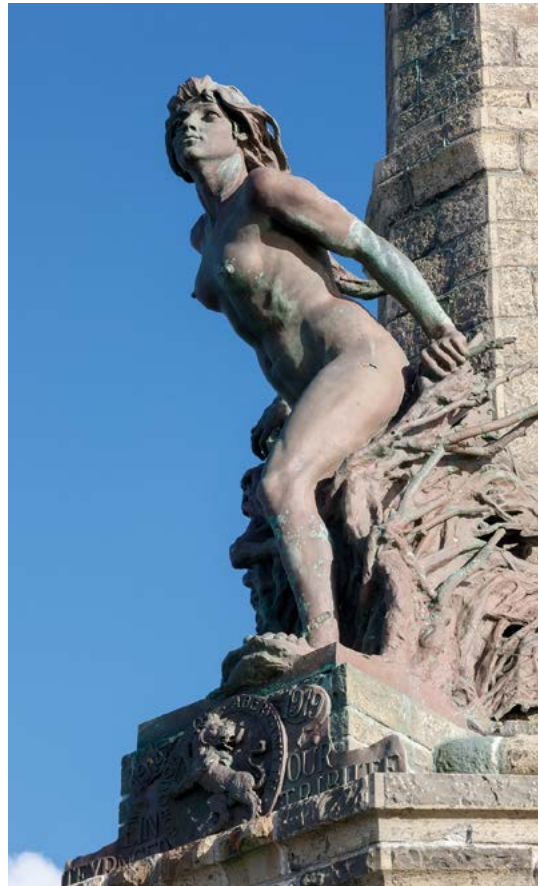
Wrought-iron armatures may be found within bronze statues, left over from the casting process or as structural support. Wrought iron expands considerably as it corrodes in damp or wet conditions, which can cause 'oxide jacking' of the surrounding material and consequent structural damage to the bronze elements. If water has reached internal armatures the surface of the bronze needs to be checked for physical damage or corrosion and a specialist metals conservator should repair it to prevent further water penetration.

Sometimes, bronze is painted over with gloss or 'bronze' paint in an attempt to minimise maintenance or arrest deterioration. This will significantly change the appearance of the memorial and store up future problems. Where paint has been applied in the past, it should be removed if possible and a suitable patination finish and wax applied by a conservator.

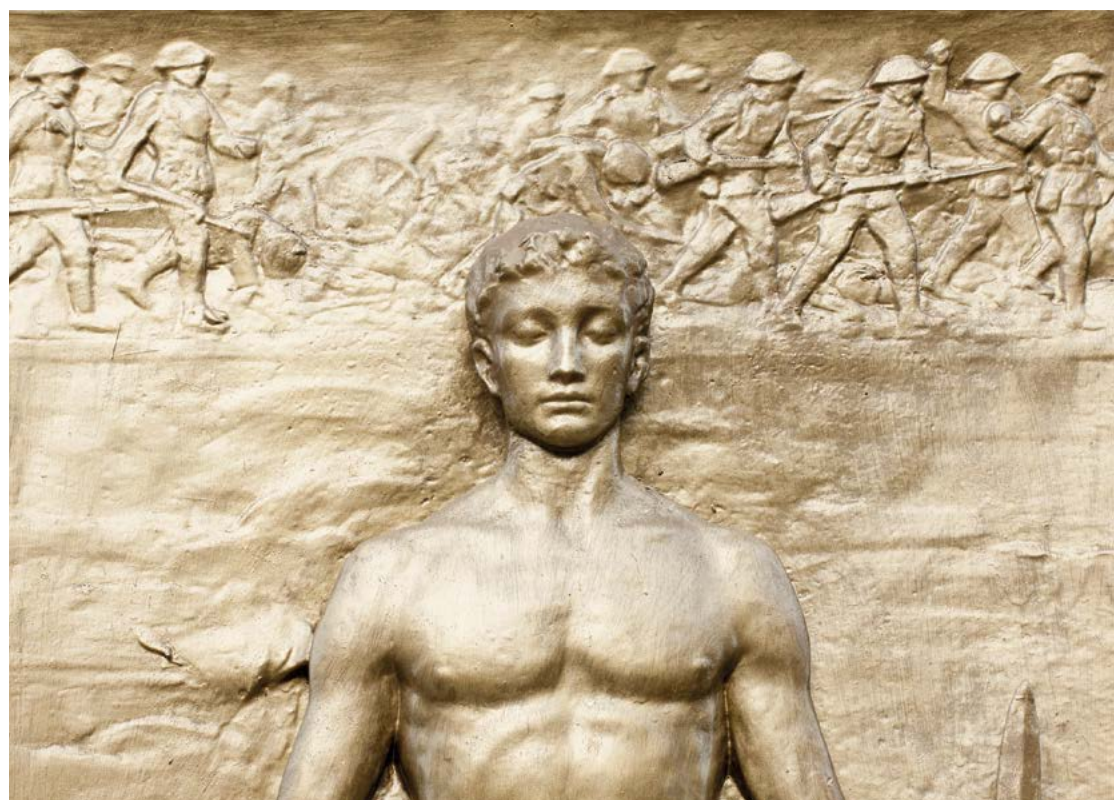
Cleaning bronze

Generally, cleaning of bronze should be done by a specialist but you can do basic cleaning using low-pressure mains water, non-ionic detergents and natural bristle brushes on site for simple

bronze elements such as plaques. Normally, this is all that is required for a maintenance regime. For any works more advanced than this basic maintenance, or if you are concerned about



The bright green pustules shown in the detail from this statue suggest active corrosion.



The brush strokes on this memorial suggest that bronze paint has been used either to try to restore or arrest deterioration of the bronze. This has probably changed the appearance of the memorial and is not a recommended treatment for bronze.



the condition of the bronze, you will need to engage a metals conservator. More extensive bronze conservation is normally done off site in workshop conditions. If this is not possible, extra care must be taken to protect against damage. Patination requires heat to be applied which could cause the bronze to expand and crack surrounding masonry.

Most cleaning methods followed by re-patination and waxing will result in a slightly patchy appearance. This is normally acceptable and will present the memorial in its conserved state. To achieve a restored or 'as new' appearance, the bronze will have to be stripped back to bare metal using abrasive cleaning and then re-patinated and waxed. This will result in the loss of any remaining traces of the original surface finish and should only be undertaken in exceptional circumstances, such as where there is active corrosion.

Steam cleaning

(use a specialist contractor)

Steam cleaning can be an effective technique for removing corrosion products and surface deposits when used at low to medium pressures. It may not remove all traces of corrosion products so the surface should be carefully checked over after cleaning. Steam cleaning should always be undertaken by specialists.

Low-pressure abrasive cleaning

(use a specialist contractor — see p. 10)

Low-pressure abrasive cleaning should only be used locally to remove active corrosion deposits and severe soiling from bronze sculptures as they can also remove original patination layers. You should use a metals conservator because such methods can damage the original surface finish if used incorrectly.

Chemical cleaning

(use a specialist contractor)

The use of chemical cleaning agents, normally acid- or alkali-based products, are not generally suitable for cleaning bronze on war memorials. These products are likely to cause damage to the patination and may affect rainwater run-off

which can damage or discolour stone plinths. Where bronze elements have graffiti damage, the use of chemical cleaning materials may be required. Such specialist cleaning should always be entrusted to a conservator.

Other methods

(use a specialist contractor)

Other types of cleaning such as blasting with particulate matter or high-pressure water washing are not recommended as they can be excessively abrasive and may cause damage to the bronze or surrounding masonry. War memorials should never be cleaned with household brass or metal cleaning products, acid- or alkali-based cleaners, or abrasive processes such as sanding or wire brushing. These methods are likely to damage the metal. Phosphor bronze brushes are sometimes specified, but these can also damage the surface patination and are not recommended unless used by a metals conservator when a less abrasive method is not suitable.

Re-patination and re-waxing

(use a specialist contractor)

Re-patination of bronze memorials is a specialist process which should be undertaken by a conservator. It involves cleaning back corrosion products and re-applying patination over the existing finish. In extreme cases of active corrosion, it is necessary to clean back to bare metal and re-patinate. Re-patination can be a controversial area of conservation so professional advice should be sought on what is appropriate for a specific memorial.

Where re-patination is agreed and unless there is severe corrosion, your conservator should take a moderate approach that preserves any original surviving patination layers. After cleaning and re-patination works, the bronze should be protected with a microcrystalline wax. Re-waxing should be carried out at least every three years as part of your maintenance programme. This will avoid the need for expensive repair and conservation work in the future. The old wax will need to be removed before new wax is applied.

There is a help sheet, *Conservation: Bronze*, on the War Memorials Trust website.

Opposite: Dark brown is the most common patination finish for bronze and requires regular re-waxing to keep it in good condition, like this war memorial at Pontmorlais, Merthyr Tydfil. Waxing should only be done by a specialist conservator.

Brass

It is quite common to find brass memorial panels within a church or chapel, or town or village hall. Brass panels may have embossed or inlaid lettering and sometimes hammered relief decoration. Brass is an alloy of copper and zinc and can be polished to a high shine. However, it can corrode or tarnish if unprotected, particularly in a damp atmosphere. Brass is often lacquered to inhibit tarnishing and to retain a shiny appearance. Overzealous cleaning can damage the lacquer and cause deterioration.

Brass is most commonly used for memorial panels within buildings. Light dusting should be sufficient to maintain the brass in good condition.



Lacquer is prone to crazing as it ages. In such cases the lacquer will need to be removed and replaced by a specialist conservator.

Un-lacquered brass can be gently buffed with a soft cloth but frequent polishing, particularly with the use of abrasive polishes, will erode the surface and may damage inscriptions and other detail over time. Household brass cleaners should not be used as they can leave a salt residue. The application of a microcrystalline wax can help inhibit corrosion and retain a shiny appearance. Brass can be prone to dents or scratches, so careful handling is required if the memorial is moved for cleaning or repair, or if it is in a vulnerable location.

Your annual maintenance strategy for brass should consist of inspection, light dusting and cleaning with distilled water and a non-ionic detergent — if necessary. Take care not to leave any residue and dry the surface afterwards. Dirt can be removed from crevices and inscriptions using a soft natural bristle brush. You do not need a specialist unless there is severe soiling or deterioration, then specialist conservation work may be required to remove old lacquer and re-finish.

Copper

Copper may be used as a roofing material on some war memorials but it is more likely to be used for inlaid or embossed panels inside a building. Like bronze, copper may be pre-patinated for artistic effect, or polished and lacquered to prevent corrosion and retain a shiny metallic appearance. Copper left untreated will gradually acquire a green patina over time. Internal copper components should be lightly dusted or washed, much like brass.

Ironwork

War memorials sometimes have iron components, particularly railings or gates, but occasionally there may be iron components in the memorial itself. Both cast and wrought iron can be very durable if well protected, but they are vulnerable to corrosion if not maintained. Iron elements can also suffer from impact damage, vandalism and theft. Repairs to ironwork should be undertaken using traditional materials and methods.

Cleaning ironwork before re-coating (use a specialist contractor)

The paint on iron protects it from water, which causes corrosion, and needs to be maintained. Metalwork will often need to be cleaned in order to prepare the surface for re-coating and should be carried out by a specialist contractor. Any loose or ingrained surface dirt or rust should be removed but original layers of paint and decorative schemes should be left, unless more extensive conservation or repair work is necessary.

Although chemical cleaning using acid cleaners or chemical dips is sometimes suitable for removing heavy rust staining and for stripping metal bare ready for re-coating, it is not recommended in most situations as there is a risk of damaging the metalwork from over-cleaning and deposition of salts. Chemical dipping is carried out off site and requires the metalwork to be dismantled. This should only be specified on the advice of a conservator. Metalwork should be thoroughly steam cleaned following chemical cleaning to ensure that all of the chemicals have been removed.

Water washing using natural bristle brushes can be effective at removing soluble salts and loosely bound dirt or loose paint. Ironwork should be carefully dried before applying new coatings. High-pressure water washing, using a proprietary vortex or spinning jet system, can be useful in removing rust and paint; however, it risks forcing water into crevices or voids which can increase the risk of future corrosion.

Abrasive cleaning and surface preparation using wire brushes and scraping is effective and unlikely to cause damage, but is only really suitable for small areas. Mechanical abrasive cleaning using power tools should only be considered in cases of severe corrosion and should be carried out by a specialist ironwork conservator. Wet and dry abrasive blast cleaning and dry-ice blasting are all effective at removing rust and paint in preparation for re-coating, but should only be carried out by a skilled contractor to avoid damaging the metal surface.

These types of abrasive cleaning can be difficult to control and there is a risk of

damaging surrounding stonework through abrasion or water run-off. Such methods should only be carried out on the advice of a conservator and are not normally necessary or appropriate for routine maintenance work.

Following cleaning, a specialist should treat the ironwork with primer and micaceous iron oxide, and paint using a historically accurate colour.

War memorials often have iron railings and sometimes plaques or panels. Iron can be very durable when it is well maintained. Regular inspection and maintenance will be necessary to ensure that the intricate detail does not deteriorate.



Lead

(use a specialist contractor)

Lead may be used on war memorials for roofing or flashing, cast statues or lettering. New lead work is normally pre-patinated with oil to prevent the formation of lead oxide which can cause white staining and run-off. Lead is a very durable material and requires minimal maintenance. However, by far the biggest threat to lead on war memorials is theft (see p. 24). Missing or damaged lead details, such as flashings, should be replaced by a specialist contractor as a priority as they are often protection against weathering.

Left: Paper memorials require sensitive handling. This roll of honour is protected by a glass case.

Right: Lists of names may be recorded on wooden panels inside buildings. Here, the names have been gilded. Light dusting should be sufficient to keep the memorial clean, but any repairs should be done by an appropriate specialist.

Gilding

(use a specialist contractor)

Gilding is the application of thin layers of gold leaf on architectural details. It is sometimes found on war memorials, both inside and outside buildings. Although gold leaf is a very delicate material, it is surprisingly robust and will not tarnish. Outside, the main threat to gilding is the weather; inside, the main threats are abrasion or

damage from cleaning as the thin layer of gold leaf is easily rubbed away. Gilding should only be cleaned by gentle dusting using very soft gilding 'mop' brushes. Gilding must never be rubbed or washed. The use of 'gold' paint is never recommended for repair or conservation works as it will tarnish too quickly and does not have the same lustre as genuine gold leaf. All repair work should be done by a specialist conservator.

Wood

Carved or painted wooden memorials are quite common in churches, chapels and civic buildings, sometimes with gilding or inlaid panels of brass or bronze. You should limit cleaning to gentle dusting for painted or varnished wood. Untreated wood can be protected with a natural beeswax polish, applied very sparingly once or twice a year. The use of household cleaners, polishes and water can damage timber elements and should be avoided. If you are in doubt about any aspect of looking after wooden memorials, you should consult a conservation specialist.





Commemorative stained-glass windows, such as this example in Tabernacle Congregational Church, Haverfordwest, are a common feature in places of worship and sometimes in civic buildings too. Cleaning should be limited to gentle dusting and occasional washing. For more extensive work, you should consult a specialist conservator.

Problems affecting timber structures, such as lychgates, are generally caused by water which rots the wood. In such cases a specialist should be consulted to advise on repair options. Where possible, original timber should be repaired rather than replaced.

Paper

(use a specialist contractor)

Paper memorials, such as books containing rolls of honour, require protection from handling and excessive changes in temperature and humidity. You should seek specialist conservation advice for their presentation, maintenance and repair.

Mosaics

(use a specialist contractor)

Memorials sometimes incorporate mosaics. Where present and in need of repair, the advice of a specialist conservator should be sought.

Painted decoration

Painted decoration may be found on memorials both inside and outside buildings and its care will depend on the type of paint, its condition and the underlying material. Gentle cleaning such as dusting (inside) and washing (outside) to sound paintwork may be possible but do not attempt to retouch or repaint yourself, which should be done by a conservation specialist.

Stained and decorative glass

(use a specialist contractor)

It is not uncommon to find memorials in the form of coloured or stained-glass windows, often in churches or chapels, but sometimes in other public buildings. Some were commissioned by individual families in honour of a lost son or father, but there are examples of larger windows commissioned as collective war memorials. Decorative glass can be coloured, etched or engraved with decoration and lettering.

Individual panes are mounted in a framework of slender lead rods known as cames, which are supported by horizontal supports called saddle bars made typically of iron or bronze. Glass is fragile and can be damaged by impact, vibration or vandalism. Thermal movement of the metal elements can also cause decorative glass windows to deteriorate and become loose or warped over time. They should be inspected periodically for signs of distress. Distortion can be mitigated by adding saddle bars and fixing the lead cames in position with copper wire. This type of work should be done by a glass conservator.

Stained-glass windows are sometimes given an external protective covering to improve energy efficiency and protect the window from damage. If not suitably designed and ventilated these forms of secondary glazing can

lead to problems from condensation and lead to accelerated decay of the timber or metal elements of the glazing.

Polycarbonate sheeting should be avoided as it yellows and becomes brittle with age. Where protection is required due to a risk of vandalism, the installation of powder-coated stainless steel mesh may be an acceptable solution. It should, however, be set within any decorative window tracery rather than across the whole window and fixed with non-ferrous screws into the mortar joints.

Memorial windows should be routinely inspected for signs of damage or decay, so that conservation work can be planned at an early stage. You should limit cleaning stained glass to dusting with a soft brush or duster, or occasional gentle washing with a soft, damp cloth to avoid scratching the surface or affecting any applied decoration. Glass-cleaning

products should not be used on stained or painted glass. The advice of a specialist conservator should be sought for more extensive cleaning, repairs, or replacement of individual panes or comes.

Buildings

Sometimes, whole buildings are memorials and these too require sensitive maintenance and conservation in keeping with their purpose. Modern adaptation may require planning permission or listed building consent. Your local planning authority should be able to advise what permissions are needed.

Protecting against theft of metals

Metal components of war memorials can be targeted by thieves — particularly lead, copper and bronze. You can protect against metal theft in a number of ways, including physical fixings or barrier alarms. Forensic marking is increasingly being applied to metal elements of war memorials to try and deter thieves. This works most effectively when used with other security measures and when its use is clearly advertised with warning signs, which should not be on the memorial itself. Signs should be carefully sited to avoid visual intrusion and clutter that could spoil the appearance of the memorial.

War Memorials Trust has further guidance on this, including the In Memoriam 2014 project which provides SmartWater free to custodians of war memorials to help prevent theft (see p. 30 for further details).

Where theft does occur, ideally, you should replace the stolen item like-for-like and put in place anti-theft measures, such as additional fixings. In cases where there is persistent theft, replacement with an alternative material may be appropriate, so long as it is physically and aesthetically compatible with the original memorial. Synthetic replicas such as resin plaques are not normally considered suitable replacements on historic memorials. For further information, Cadw endorses English Heritage's publication *Theft of Metal from Church Buildings*.

Llanwrtyd Wells War Memorial Institute was opened and dedicated in 1928 to commemorate the fallen of First World War. It is a grade II listed building which means that listed building consent may be required for any alterations, as well as planning permission, to ensure that the integrity of the original structure is maintained. The local planning authority would be able to advise.





Graffiti and vandalism

Sadly, even war memorials are not immune to graffiti and other vandalism. Graffiti typically appears in the form of spray paint (aerosols), marker pen, carvings or scratches. It is usually a priority to remove graffiti as quickly as possible because it has a very negative impact on the appearance of war memorials. Prompt removal will help discourage copycat attacks and it is also sensible from a technical perspective as paints, glues and inks become increasingly difficult to remove as they dry.

Despite the need for a quick response, you do need to consider carefully the removal method so that you do not make the damage worse. It is a good idea to have to hand details of conservation specialists who know how to treat the materials your war memorial is made of so that you can get advice and remedial work can be started as soon as possible. Normally all work to repair damage caused by graffiti should be done by a specialist.

If a war memorial has been vandalised, it is important to record the incident with photographs and a written description. Notify the police and obtain a crime reference

number, which will be needed for any insurance claim. Professional advice will be needed to decide on the most appropriate action such as cleaning, stone repairs and so forth. Check with the local planning authority whether the monument is listed and to obtain advice and necessary consents for remedial work. A suitably skilled contractor will be required and cleaning trials may be necessary before any work is undertaken.

Removing graffiti

(use a specialist contractor)

While most types of paint and other media can be removed from a stone surface, problems can arise when pigments are carried into the pores by solvents in the paint. The application of additional solvents to try and remove the paint can sometimes result in the pigments being driven further into the pores. Use of oil-based products, bleach or detergents can also cause staining or discolouration and should only be used as advised by a specialist conservator.

Measures must also be taken to ensure run-off, aerial mists, drips and splashes do not harm the rest of the memorial or the wider environment. Operatives should follow product

Physical barriers can help deter thieves and vandals such as the spiked railings around the war memorial at Magor.

guidelines in term of application and removal, and wear the appropriate protective equipment.

It is impossible to remove graffiti where physical damage has been caused, such as names carved into the stone. In such cases a judgement has to be made whether it is desirable to repair or re-face the affected stone.

Preventive measures

If graffiti is a persistent problem in a particular location it may be prudent to consider applying a sacrificial barrier-coating system as a preventive measure. It will not stop graffiti but it will make the removal process more straightforward. A specialist contractor should be consulted.

Sacrificial coatings are normally made from

polysaccharides and can be removed with low- to medium-pressure water washing or steam cleaning. The coating will need to be reapplied to the memorial after each graffiti removal. Another option for stone is to use microcrystalline wax. Any type of coating can change the appearance of the memorial, sometimes leaving a glossy finish, and may affect the permeability of the stone. However, a balance must be struck between the visual and physical impact of the coating, and the risk of damage from future graffiti attacks and consequential cleaning. Permanent, acrylic-based or other irreversible coatings are not suitable for war memorials.

Other preventive measures to reduce the risk of vandalism include Neighbourhood Watch schemes, improved lighting, CCTV and physical barriers such as gates, fences and landscaping (both hard and soft). The crime prevention officer of your local police force may be able to advise you on measures to reduce the risk of future vandalism. See English Heritage and War Memorial Trust's *War Memorial Theft: Prevention and Solutions* for further suggestions.

Bird control

Birds, especially pigeons, seagulls and starlings, can affect war memorials by soiling and building nests. Bird droppings can leave stains on stone and metalwork. This spoils the appearance and may also promote decay processes. The droppings are normally acidic and run-off can cause corrosion or bleaching.

Although spikes can be fixed to ledges or flat surfaces to prevent birds from landing, these are visually intrusive and rarely appropriate for war memorials unless the memorial is housed within a larger building. Fine netting strung across openings and over roosting sites is generally not suitable for war memorials. Bird repellent gels can damage the surface of metals and stone, and are not recommended. In some cases, decoys of birds of prey placed nearby may be effective to prevent roosting. For many memorials in urban areas, the only solution may be regular maintenance and surface cleaning to prevent a build up of bird droppings.

Bird droppings can be acidic and cause corrosion. They are also unsightly and difficult to prevent – especially in an exposed location like this memorial at Llanelli. Regular maintenance is the best way to ensure that no long-term damage is caused.



Summary of Common Defects

Problem	Cause	Solution
Soiling of stone	Elevated moisture levels and/or atmospheric pollution.	Possibly gentle cleaning depending on stone type or condition.
Vegetation and biological growth	Lack of maintenance, excessive ground or surface moisture.	Remove vegetation, ensure adequate drainage and air movement.
Open joints in stonework	Deterioration of pointing, invasion of vegetation causing jacking, aggressive cleaning, structural movement.	Remove vegetation, rake out and re-point with lime mortar. Check for underlying movement.
Loss of surface detail of stone	Aggressive cleaning, natural erosion, poor-quality stone.	Reduce or avoid cleaning. Re-face stone only as a last resort.
Eroding stonework or inscriptions	Weathering of soft stone, aggressive cleaning methods, incorrectly bedded stone.	Re-cut inscriptions when illegible. Consider indenting new stones if severely decayed.
Discolouration of bronze	Corrosion, lack of maintenance.	Stabilisation with wax, or cleaning, re-patination and re-waxing.
Rusting ironwork	Lack of maintenance, paint deterioration.	Clean back, treat with primer and micaceous iron oxide and paint.
Graffiti	May be more likely where memorial is neglected.	Clean stone using appropriate method. Consider sacrificial anti-graffiti coating if graffiti is persistent.
Bird mess soiling	Birds, overhanging trees or cables.	Regular cleaning and maintenance.

War memorials — like this at Builth Wells — remain highly visible focal points in communities throughout Wales. Advice and grants are available to assist in their repair and keep them well maintained for the future.



Grants, Advice and Useful Resources

Grants

Cadw is the Welsh Government's historic environment service and is responsible for advising Welsh ministers on the scheduling of ancient monuments and the listing of buildings. Cadw provides funding to support the conservation and repair of war memorials in Wales.
www.cadw.wales.gov.uk

War Memorials Trust is a charity that works for the protection and conservation of war memorials in the UK. It provides free conservation advice and information on a range of war memorial issues as well as administering grant schemes, which can support the repair and conservation of war memorials. The Small Grants Scheme is open to everyone to apply, but please note that War Memorials Trust cannot fund works after they have started or been completed. Please visit the grants section of the War Memorials Trust website for further information on these schemes, how to apply, other sources of funding and advice for applicants.
www.warmemorials.org/grants

Memorials Grant Scheme is run by the Department for Culture, Media and Sport and can return, as a grant, the VAT incurred in memorial projects, including new memorials. Please see the website for details on eligibility and how to apply. The scheme is currently confirmed to run until 2015 so you should check that the scheme is still active before applying.
www.memorialgrant.org.uk

The **Heritage Lottery Fund** can provide funding to help groups, communities and organisations mark

the centenary of the First World War, including memorials, buildings and sites. www.hlf.org.uk and Understanding the First World War — Heritage Lottery Fund www.hlf.org.uk/HowToApply/whatwefund/FirstWorldWar/Pages/FirstWorldWar.aspx

Advice

Conservation Officers in local planning authorities offer advice relating to listed buildings and broader conservation matters, including war memorials. Local authority **War Memorials Officers** are the best place to start if you want to find out more about caring for your war memorial and may be able to help with conservation advice. You should place a record of your war memorial with your War Memorials Officer. Details of War Memorials Officers are on the War Memorials Trust website.
www.warmemorials.org/wmo-wales

The Royal Commission on the Ancient and Historical Monuments of Wales maintains the **National Monuments Record of Wales (NMRW)** — the national collection of information about the historic environment of Wales, which includes records of war memorials. You can search for records on their online database **Coflein**. www.coflein.gov.uk You should place the record of your memorial with the NMRW.

The four **Welsh archaeological trusts** hold the Historic Environment Records (HERs), which aim to record all of the known historic and archaeological features in Wales. You should place the record of your war memorial with the appropriate trust (see p. 30 for contact details).

The records are available online at www.archwilio.org.uk and via the Android app Archwilio, which can be downloaded from Google Play.

War Memorials Trust offers practical advice and guidance about conserving and maintaining your war memorial and provides a range of online help sheets and frequently asked questions.
www.warmemorials.org

The **Imperial War Museums** are also compiling a comprehensive record of all war memorials in the UK. The **War Memorials Archive** was formerly known as the UK National Inventory of War Memorials.
www.iwm.org.uk/warmemorials

For further advice and to find a suitable contractor, you can consult the Conservation Register, Conservation Accreditation Register for Engineers, Register of Architects Accredited in Building Conservation and the Royal Institution of Chartered Surveyors. For contact details, see website addresses below.

Useful resources

Publications

G. Archer, *The Glorious Dead* (Kirstead 2009).

J. Corke, *War Memorials in Britain* (Oxford 2005).

English Heritage and War Memorials Trust, *Advice on Maintenance of War Memorials* (London 2006).

English Heritage and War Memorials Trust, *War Memorial Theft: Prevention and Solutions* (London 2009).

English Heritage, *Theft of Metal from Church Buildings* (London 2011); available online at: <http://www.english-heritage.org.uk/professional/advice/advice-by-topic/places-of-worship/theft-protection/>

English Heritage, *The Conservation, Repair and Management of War Memorials* (London 2014).

A. Gaffney, *Aftermath: Remembering the Great War in Wales* (Cardiff 1998).

Historic Scotland and War Memorials Trust, *The Repair and Maintenance of War Memorials, Short Guide 3* (Edinburgh 2013); available online at: <<http://conservation.historic-scotland.gov.uk/publication-detail?pubid=9912>>

J. Summers, *British and Commonwealth War Cemeteries* (Oxford 2010).

J. Winter, *Sites of Memory, Sites of Mourning: The Great War in European Cultural History* (Cambridge 1995).

All War Memorials Trust help sheets are available online at: www.warmemorials.org/a-z

Websites

In Memoriam 2014 is an initiative from War Memorials Trust and the SmartWater Foundation that provides free SmartWater forensic marking to war memorial custodians to protect metal elements.

www.inmemoriam2014.org

War Memorials Online is a project aiming to create a greater understanding of the condition of war memorials by seeking the help of the public to upload information, photographs and condition reports. www.warmemorialsonline.org.uk

The Imperial War Museums' War Memorials Archive www.iwm.org.uk/warmemorials

Cymru'n Cofio — Wales Remembers 1914–1918 www.walesremembers.org

The Welsh Experience of World War I <http://cymruww1.llgc.org.uk>

Commonwealth War Graves Commission www.cwgc.org

The Society for the Protection of Ancient Buildings (SPAB) can provide advice and guidance for the care of historic buildings, including war memorials. www.spab.org.uk

Institute of Historic Building Conservation is the principal professional body for building conservation practitioners and historic environment specialists. www.ihbc.org.uk

The Building Conservation Directory is a useful resource for finding conservation products and services. www.buildingconservation.com

The Conservation Register can help you find conservation contractors. www.conservationregister.com

Institute of Conservation (ICON) is a good resource for conservation advice and manages the Conservation Register. www.icon.org.uk

CARE (Conservation Accreditation Register for Engineers) www.careregister.org.uk

AABC (Register of Architects Accredited in Building Conservation) www.aabc-register.co.uk

RICS (Royal Institution of Chartered Surveyors) Find a Surveyor www.ricsfirms.com

The Twentieth Century Society www.c20society.org.uk

Addresses

Cadw, Welsh Government
Policy and Protection Team
Plas Carew
Unit 5/7 Cefn Coed
Parc Nantgarw
Cardiff
CF15 7QQ
01443 336059
cadw@wales.gsi.gov.uk
www.cadw.wales.gov.uk

War Memorials Trust and War Memorials Online
2nd Floor
42a Buckingham Palace Road
London
SW1W 0RE

Conservation advice/grants:
020 7233 7356 / 0300 123 0764
conservation@warmemorials.org
www.warmemorials.org
info@warmemorialsonline.org.uk
www.warmemorialsonline.org.uk

War Memorials Archive
Imperial War Museums
Lambeth Road
London
SE1 6HZ
020 7207 9863/9851
memorials@iwm.org.uk
www.iwm.org.uk/warmemorials

The Royal Commission on the Ancient and Historical Monuments of Wales
Plas Crug
Aberystwyth
SY23 1NJ
01970 621200
nmr.wales@rcahmw.gov.uk
www.rcahmw.gov.uk

Clwyd-Powys Archaeological Trust
41 Broad Street
Welshpool
SY21 7RR
01938 553670
trust@cpat.org.uk
www.cpat.org.uk

Dyfed Archaeological Trust
The Shire Hall
8 Carmarthen Street
Llandeilo
SA19 6AF
01558 823121/131
info@dyfedarchaeology.org.uk
www.dyfedarchaeology.org.uk

Glamorgan-Gwent Archaeological Trust
Heathfield House
Heathfield
Swansea
SA1 6EL
01792 655208
enquiries@ggat.org.uk
www.ggat.org.uk

Gwynedd Archaeological Trust
Craig Beuno
Garth Road
Bangor
LL57 2RT
01248 352535
gat@heneb.co.uk
www.heneb.co.uk

This depiction of a soldier exhausted by war, on the memorial in Abergavenny, is a potent reminder of why we need to continue to care for war memorials in Wales.





**CYMRU'N COFIO**
WALES REMEMBERS
1914 - 1918


War Memorials Trust

 **Cadw**