



Mortar is a key component of many war memorials. This helpsheet aims to provide information on best conservation practice and assist custodians in understanding why, when and how mortar should be used, as well as explaining why other materials are inappropriate.

If you require any further advice, please contact the Trust's Conservation Officer.

Why mortar is used

Mortar contains materials which bind the parts of a monument's structure together and allow them to work in harmony. However, not all types of mortar have the right qualities for historic monuments so it is important to choose the most appropriate type for your war memorial. The most commonly used mortar is lime mortar which is explained below.

Historic memorials have different needs to their modern counterparts. They were designed to 'breathe', which means that there is an exchange of moisture and air between the inside of the monument and its surroundings. The moisture usually travels through the weakest part of the structure which is the mortar, which will eventually crumble and decay. This is acceptable because it is acting in a sacrificial manner and it ensures the structural elements, such as stone slabs and sculptures, are protected. It is also a lot cheaper to replace mortar than stone.

Lime mortar

Lime mortar was a traditional building material used for hundreds of years until the late 19th century. Our understanding of lime was lost as new types of cement came onto the market and building requirements changed. From the 1970's onwards, it was realised that lime was the most suitable material for historic monuments and there was a revival in its production.

The main ingredient of lime mortar is limestone (calcium carbonate). It is mined, crushed and burnt to produce 'lime' (calcium oxide). This is mixed with water and a suitable aggregate, usually sand, to produce mortar.

The lime and water in the mortar give it flexibility and so it can be easily handled for laying bricks and pointing joints. Once in place, the mortar slowly absorbs carbon dioxide from the air and the lime turns back into crystalline calcium carbonate (limestone). This means it has bound the elements of the monument together in a semi-rigid structure.

Types of lime mortar include:

- **Hydraulic**

This form is traditionally used for masonry. This form can come in a variety of strengths and can

War Memorials Trust 14 Buckingham Palace Road London SW1W 0QP

Telephone: 020 7233 7356/ 0300 123 0764 Fax: 020 7834 0202/ 0300 123 0765

Email: conservation@warmemorials.org Website: www.warmemorials.org

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set underwater or in very wet conditions. NHL 3.5 is the most commonly used strength for stone war memorials.

- **Non-hydraulic**

This lime is weaker than the hydraulic form so it is mainly used externally for weakened brickwork or stone and for internal work such as plastering.

Re-pointing and repairing

- **Re-pointing**

When undertaking re-pointing, it is advisable to employ a qualified professional as lime mortar is a complex material. On some larger projects, analysis of the existing mortar can be carried out to determine what aggregates are present. Defective joints should be raked out carefully by hand and the pointing finish should match the original in colour, texture and strength.

- **Repairing**

Lime mortar can also be used to repair small areas of stone or brick which have weathered away. It should be noted this is a short term solution as the exposed mortar can weather quite rapidly and therefore maintenance will be required.

For large areas, it is advisable to undertake stone or brick repair by piecing in new material rather than using mortar.

- **Should cement be used?**

Whilst cement is useful in certain circumstances because of its strength, it is too strong and impermeable to be used with historic stone and brick. When suffocated with materials such as cement, dampness can build up inside the monument leading to decay and shortening its lifespan. Cement is also too rigid which means it cannot accommodate natural movement within the monument and this can cause cracks to appear in brickwork and masonry.

Further information

- **War Memorials Trust**

The Conservation Officer, 14 Buckingham Palace Road London SW1W 0QP, T: 020 7233 7356/ 0300 123 0764, E: conservation@warmemorials.org, W: www.warmemorials.org

The Trust's Conservation Officer can give further advice and guidance about the use of mortars on war memorials. Please see War Memorials Trust's 'Conservation contacts' helpsheet for further information about qualified professionals and sourcing lime mortar.

- **The technology and use of hydraulic lime**

An article by John Ashurst (1997) which can be viewed at: www.buildingconservation.com/articles/lime/hylime.html.

- **The directory of building limes**

English Heritage directory by J Teutonico (1997), published by Donhead Publishing (ISBN 1 873394 21 7).

Please note that this helpsheet is intended to offer informal advice and is a distillation of experience. The information contained in this helpsheet is not exhaustive and other sources of information are available.