

Historic buildings Pointing

This leaflet describes the appropriate use and application of mortar pointing - as well as some of the pitfalls of using incorrect materials or techniques.

There is a list of references and useful contacts on the last page.



Good and bad tuck pointing

Introduction

Re-pointing using the wrong techniques or inappropriate materials can seriously damage the character of a wall and can promote its erosion through the action of rainwater and soluble salts.



Example of damaged brickwork

History

For over two thousand years the lime mortar used for bonding bricks or stones together has served two vital functions: holding the individual bricks or stones together to form a coherent structure; and assisting in spreading the load evenly through the wall. It is only since about the 18th century however that the appearance of the pointing has been refined for aesthetic and weathering purposes.

In rubble stone work, flint work, or in older brickwork from before the 18th. century, lime mortar was applied as function dictated. The appearance of the mortar was not afforded major importance.

However, during the 18th. century, the skill of the brickmakers improved. Later still bricks became more uniform in shape due to the mechanisation of their manufacture. Classical architecture also slowly developed in Britain. These two influencing factors meant that brick dimensions became more regular, and alternative pointing techniques developed, to enhance the appearance and significance of the masonry.

From the Roman period until the mid 19th. century, mortar consisted of lime and a gritty aggregate mixed together with a fine grade sand. Most of the time these ingredients were gathered together and manufactured close to the site of construction.

The vast majority of lime used was non-hydraulic; which means it set through the process of drying in the air. But after about 1760 hydraulic lime was re-discovered on a large scale in Britain. Hydraulic lime sets chemically, due to a proportion of clay in the limestone.

By the mid 19th century, modern 'Portland' cement had been invented. Mortar made with this cement replaced the coarse, pale finish of lime mortar, considered so attractive in old walling. The new cement was termed 'Portland' because it was thought to closely match the appearance of Portland stone.





◀ Lime mortar is porous, flexible and relatively soft

Hard cement mortar has damaged the surface of the brickwork ▶



Description

Pointing is the process of filling the outer parts of the joints in stone or brick walls where the bedding mortar has been deliberately left out or raked back, or where the surface has weathered back from the face of the brick or stone. Re-pointing is therefore the re-filling of such joints.

Lime mortar

Lime mortar is porous, flexible and relatively soft.

- The porosity of the lime mortar enables the moisture within the wall to evaporate through it, rather than through the masonry itself. This ensures that the potentially damaging salts within the moisture, and those within the masonry itself, are expelled without affecting the face of the masonry.
- The flexibility of the lime mortar ensures that small movements within the wall caused by temperature change or by structural movement can be accommodated to some extent. It also has the ability to 'heal' itself when hairline cracking occurs.
- The softness of lime mortar is a characteristic of the constituent parts of the mortar. This softness in no way indicates that the mortar is not 'doing its job.' In fact, soft mortar is usually more flexible and more porous than hard mortar.

Cement mortar

Cement pointing is dense and inflexible. Walls pointed with cement cannot 'breathe' properly, so when the wall becomes wet, the moisture, which is naturally drawn into the masonry, evaporates out through it, rather than through the mortar. Salts within the masonry are also expelled. These salts can seriously erode the face of the masonry as they are drawn out. Also, in the winter, water held in the masonry may freeze and cause the face to spall. Additionally, small movements within the building cannot be tolerated by cement, which cracks. Having cracked, moisture can get into the wall, and once in, is held in and must again evaporate through the masonry, which may exacerbate erosion.



Brick and stone detail



Original lime mortar in fine condition with an age old patina

Styles of pointing

Pre-18th. century pointing was usually flush with, or just set back from, the face of the brick.

The height of structural and aesthetic refinement during the 18th. century was the introduction of gauged brickwork. This involved rubbing every brick to create perfectly square faces, and then bonding them together using mortar in joints of no more than 3 or 4mm. Flush, or flat pointing continued to be used, particularly in gauged work where very narrow joints afforded little opportunity to do anything else.

From the 18th. century onwards joints were sometimes given special finishes.

Tuck pointing was introduced to mimic gauged brickwork. This involved the creation of a brick coloured mortar. This self-coloured mortar was applied flush to the face of the brick. Prior to setting, it was scored with a groove usually no wider than about 8mm, and a strip of white chalk-lime putty was then 'tucked' into the groove. This usually protruded a little from the surface of the brick. The finish produced a very fine appearance. It was labour intensive and costly, but was significantly cheaper than constructing a house using gauged brickwork.

Jointed joints were flushed up and then scored along the centre line with a knife or trowel edge. This

gave an increased appearance of uniformity to the work. 'Penny rolled joints' is a variation. The effect is produced, not surprisingly, by rolling a coin along the soft mortar to create a decorous, continuous band through the middle of the joint.

Beaked joints also known as 'V' joints were probably also used to accentuate the uniformity of the brickwork. Very few of these joint finishes have survived. Overhand struck pointing is another finish seen rarely today. This is a reversed weather struck (which it is thought is a modern detail.) The face of the joint slopes outwards from the bottom of the bed, so that it overhangs at the point where the brick above is bonded.



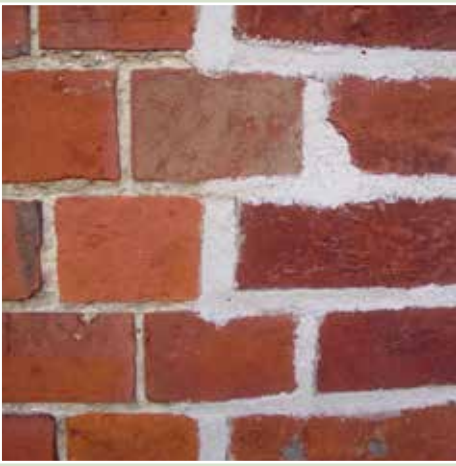
Brick and knapped flint detail



Decorative Georgian tuck pointing to the front elevation of this house with original, older pointing to the side



Fine brickwork with carefully finished jointed joints



Think very carefully whether repointing is necessary. The new mortar on the right has been crudely applied and has dramatically altered the appearance of the brickwork



Good example of local repairs using lime mortar which blends in well with the existing mortar

Is re-pointing really necessary?

Before any works of re-pointing are undertaken, an investigation must be carried out of the reasons for the decay of the existing mortar, and works of rectification carried out. Otherwise, problems such as dripping gutters or leaking water pipes, which go unnoticed, will continue to damage the wall after re-pointing has been completed.

Only too often, pointing which is soft or appears a little weathered is unnecessarily raked out wholesale and replaced crudely and inappropriately by a cement-based mortar; permanently removing from the wall the original mortar. The result is usually disastrous. The visual appearance of the wall is severely damaged and further erosion and spalling of the wall is likely to follow.

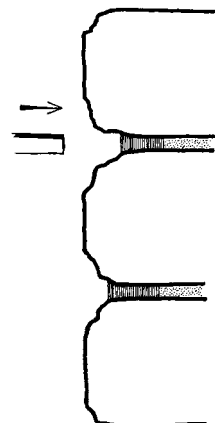
In case of any doubt, contact the Conservation Officer who will advise whether any re-pointing is necessary.

Only areas of missing or badly eroded mortar should be re-pointed. In many instances pointing of more than 100 years old is still in perfectly sound condition.

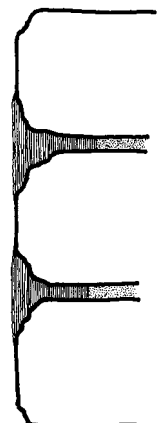
Re-pointing an entire wall for the sake of uniformity is never acceptable, as it can dramatically change the character of the whole elevation - and it is very rare that an entire elevation requires re-pointing for the sake of weatherproofing or stability. Local repair, on the basis of necessity, adds to the evolution of the wall in a practical and honest way, and is characteristic of the approach taken by bricklayers in the past. With care new mortar can be matched and finished so that it blends naturally with the old.

Where re-pointing has severely and detrimentally affected the character of the wall of a listed structure, the local planning authority may seek to remedy the damage caused to the wall, or prosecute the owner and builder as appropriate.

Setting back the face of new pointing will prevent smearing which can affect the character detrimentally.



Smearing pointing caused by levelling off the face of the mortar with the face of the brick will always be out of character and look poor.





Example of re-pointing in progress.
The brickwork has been raked out prior
to pointing

Methods of repair

Raking out

Should re-pointing be necessary, then the joint must be carefully raked out manually using a blunt screwdriver or a hacksaw blade. Raking out to a depth of at least twice the width of the joint provides an adequate key for the new mortar. However, in old irregular brickwork, it might be necessary to remove slightly more mortar than described above, so that the face of the new pointing can be kept back from the face of the bricks. This prevents mortar from spreading over the bricks. Power tools must not be used for the raking out as they can severely damage the bricks.

Mortar Mix

The great majority of non-hydraulic mortar mixes used in brick and stone building until at least the late 18th. century were of a ratio between 1:1 and 1:4 (lime:sand). Hydraulic mortar mixes used after this date were also made up in similar ratios to the non-hydraulic mixes.

The constituent parts of a mortar can be analysed to confirm the make-up of the mix. Specialists offer this service and some contacts are given at the end of this leaflet. If this cannot be done, then small slabs of dried mortar, known as 'biscuits', can be made up using mixes varying between 1:2 and 1:4. These are fully dried and then broken. The inner face can then be

offered up to the wall to compare colour and texture.

In most cases a 1:3 mix of lime:sand is considered a useful, general mix for re-pointing, appropriate for most situations. However, other proportions are sometimes specified, in situations with a particular requirement. For instance, walls in very exposed locations, which might require a slightly stronger mix; or walls made of particularly weak, friable brick, which might require a weaker mortar. In any case, the mortar must be weaker and more porous than the brick or stone, in order to allow movement of the structure and the transport of moisture through the wall, without the deterioration of the masonry.

Lime

The lime used should be in the form of putty, which can usually be purchased in tubs. It is mixed with the sand and gritty aggregate at least 48 hours before use. At this stage it is known as 'coarse stuff'.

Once mixed, this mortar will keep for about a month if protected from the air under a polythene sheet. If it is sealed in a container, it will last much longer. No water should be added to the mix because the putty is wet enough.

Aggregate

The aggregates used in historic mortars tend to be coarser than those used today. Aggregates must be matched. They add both colour and texture to the mortar, so it is important that an accurate match is found. Historically, builders used locally available sands from both sea and quarry, as well as crushed brick and tile. Additional colour was sometimes added in the form of coal ash, particularly on some 19th. century Gothic or Tudor Revival buildings where black mortar was used to contrast with bright red brick.

Ready-mixed mortar

It is possible to purchase ready-mixed 'coarse stuff'. Some companies will also provide a mortar analysis and mixing service. Some contacts are given at the end of this leaflet.

Toning - in

Mortar should not be 'toned in' using chemical dyes to attempt a ready-worn appearance. The careful selection of traditional materials should complement the original mortar in the vast majority of cases, and the effects of weathering will harmonise the appearance and texture in time.



◀ Demonstration of re-pointing

Extensive re-pointing was needed on this building. The applicant was advised to obtain listed building consent before starting work



Application

Pointing should never be attempted in frosty weather, as the wet mix will not set properly. It will expand as it freezes, then it will crack and drop out.

In hot weather too, mortar may crack and fail. Old hessian sacking can be wetted and used to cover and protect new work by preventing it from drying out too fast.

Before pointing, one should ensure that all the joints have been brushed clean of any dust and then wetted sufficiently so that the mortar will stick to the wall, rather than drying out too quickly and dropping out.

There are a couple of methods for applying mortar into the joints of a wall. The most traditional, but perhaps most difficult to achieve satisfactorily, involves pushing the mortar into the joint using metal pointing 'irons', finishing the face in a manner to match the surrounding pointing. The tools used in this exercise should be no greater in width than the width of the joint, so that the mortar can be well packed.

The alternative method involves applying heavy-duty tape along the length of each joint. The tape is then slit open along this line, and mortar pushed into the opening - again using a pointing tool. The tape is then removed and the finish applied to the pointing. This method avoids the potential for smearing mortar over the edges of the bricks,

which creates a poorly finished and inappropriate job. It is also quicker than the previous method and could be carried out by those less experienced in such delicate work.

The mortar should be finished to a shape and form to accurately match the original.

However, in certain circumstances the existing pointing might have weathered to such an extent that it is set back from the face of the brickwork and it is difficult to decipher any special original finish. In these cases it is preferable to use a flushed or slightly recessed joint to match surviving old mortar adjacent, with a textured or 'stippled' finish. This stippled finish is best achieved by the careful use of a bristle brush. The bristle ends are tapped against the mortar, once it has begun to set, to bring out the aggregates, creating a roughened face. In some instances, where a special joint finish exists, an experienced bricklayer might be required to undertake the work.

There are short hands-on courses on pointing for homeowners; information about some of them are listed at the end of this leaflet.

Listed building consent

Any works of repair on a strictly 'like-for-like' basis, using the same materials as the existing, and creating the same finish as existing, do not require listed building consent (lbc).

However, works that involve removal and replacement of existing mortar or involve re-pointing which does not match the existing precisely in materials and finish and are therefore not 'repairs on a like-for-like basis', or which involve significant areas of re-pointing, will require lbc. If you are in any doubt as to the requirement for lbc, contact the Planning Authority, who will be able to clarify the issue for you. If such works are undertaken without consent, then the local planning authority might seek to take enforcement action against the owner and the builder, either to remedy the damage caused, or to prosecute.

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Further information

Click on the website
address for link



References

Georgian Brickwork
by **Parissien, S**
The Georgian Group Guides 2

What is Tuck Pointing?
by **Reed, P and Bunney, R**
The Society of Traditional
Building Crafts

**The Conservation of Brick
Buildings - The repair,
alteration and restoration of
old brickwork**
by **Bidwell, TG**

Brick, Terracotta & Earth.
**English Heritage Technical
Handbook Volume 2**
by **Ashurst, J & N**

Society for the Protection of Ancient Buildings
37 Spital Square London E1 6DY
0207 377 1644
info@spab.org.uk
www.spab.org.uk

English Heritage
1 Waterhouse Square 138-142 Holborn London EC1N 2ST
0207 973 3000
www.english-heritage.org.uk

Georgian Group
6 Fitzroy Square London W1T 5DX
0207 7529 8920
office@georgiangroup.org.uk
www.georgiangroup.org.uk

Victorian Society
1 Priory Gardens Bedford Park London W4 1TT
0208 994 1019
admin@victoriansociety.org.uk
www.victoriansociety.org.uk

Suppliers of mortar, mortar analysis and training:

LP - Lime putty RM - Ready-Mixed mortar (coarse stuff) A - Analysis of mortar
C - Courses/training in lime mortar pointing

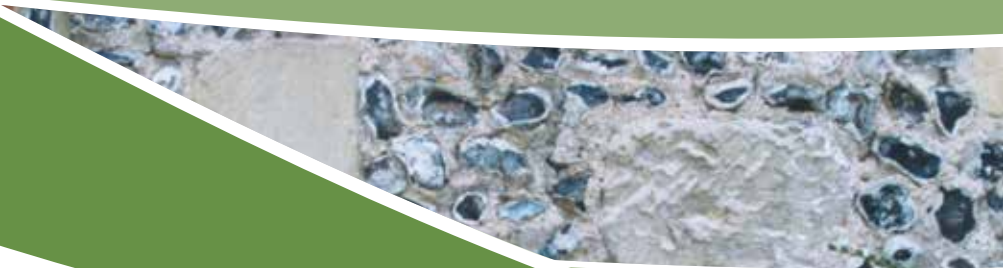
Mike Wye - LP, RM, C
01409 281644
www.mikewye.co.uk

Old House Store - LP, RM, C
0118 969 7711
www.oldhousestore.co.uk

Rose of Jericho - LP, RM, A
01935 83676
www.rose-of-jericho.demon.co.uk

**Society for the Protection of
Ancient Buildings - C**
0207 7377 1644
www.spab.org.uk

The Lime Centre - LP, RM, A, C
01962 713636
www.thelimecentre.co.uk



If you require
further information
about any of the
issues raised in this
leaflet or any other
building conservation
matters, please
contact the
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Officer at



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SO41 9ZG

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Email: enquiries@newforestnpa.gov.uk

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Tel: 02380 285345
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