

1e

Maintenance, Repair and Restoration

Stone Elevations



The Conservation Value of Stone

The local carboniferous sandstone in Bradford and Airedale, and the gritstone in Wharfedale are the predominant building materials in the district's conservation areas, regardless how old the buildings are. Historically each town, village and even some hamlets had their own stone quarries which were the main source of stone for building.

Locally quarried stone varies slightly from source to source, with exposure to pollution and the elements following the construction of a building providing further differences. The colour of sandstone varies from a light creamy hue, to a rich golden colour, but, with exposure to smoke, darkens to an almost black dark brown. The presence of different minerals or ores also has an impact, the most obvious of which is iron, which can leave sandstone with orange reddish stains.

The historically universal use of stone as a building material in the district's conservation areas helps to give each one of them a strongly unified appearance, with buildings of different ages, sizes, scales, and function sharing the grainy texture and harmonious colours of sandstone. It is this material which perhaps more than anything gives the conservation areas a local distinctiveness and character of their own, and it is therefore vital that this material continues to be used and looked after in an appropriate way.



Local stone was traditionally split into 'bricks' using a hammer to give a roughly dressed finish. Architectural members such as the surrounds to windows and doors were given a smoother finish, while the stone for the houses of the wealthy were more finely tooled or given a smooth ashlar finish by hand.

The more decorative features such as stone strings, Classical door surrounds, and stone brackets were carved by hand. The work that goes into quarrying and then shaping and finishing stonework means that it is an expensive material today, so it is important to



retain as much existing stone as possible and ensure it is in a good condition, particularly as modern artificial or reconstituted stone is a poor substitute for the real thing and has no place in conservation areas, either in new construction or repairs.

The Maintenance and Repair of Stone Elevations

Generally the stone 'bricks' which make up a wall should require little or no attention. It is only the failures of the mortar or other factors which lead to the rapid deterioration of stone.

= The deterioration of the stone may be due to the need to repoint the wall, or that an inappropriate type of mortar has been used.

= Stone cleaning is not recommended in most situations, as it robs historic buildings of the patina of age, can create unwanted contrasts between adjacent or neighbouring buildings, and if done incorrectly can damage the stonework.



= Do not paint or render stonework. The stone buildings of the district are traditionally bare, giving the built up areas a strong visual sense of unity. Painting stonework can disrupt this unity and in doing so harm the special character of a conservation area. Paint and render can also damage the stonework by trapping water and causing damp, or making existing damp problems worse. Any existing paint should be carefully removed from the stone.



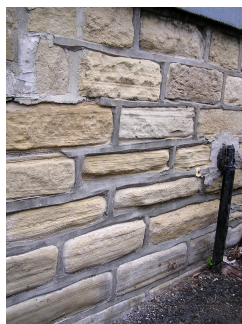
These painted elevations could be anywhere in England.



Traditionally all stonework, including the window reveals were left bare.

= Damp accelerates the deterioration of stone. Check that the rainwater goods are working properly (see *Section 1d of this guide*) and that any drains or gullies at ground level are clear. Cracks or open joints in the wall, burst plumbing or moisture becoming trapped behind hard renders can be other sources of damp and deterioration.

= If the deterioration of stone is due to traffic splashing rainwater against the wall, the solution may not be straightforward. The only way to prevent this type of damage is to prevent the splashing happening in the first place. Simply covering the damaged stones will not solve this problem and will make it worse. Replacing the stone may be the only solution.



= The stonework should be clear of vegetation, or if climbing plants are present they should be carefully managed to ensure that roots are not pushing between the stones or that moss and creepers are not encouraging damp by holding water against the stone.

= Never apply any form of sealant or silicone water repellent to stonework. This could easily trap moisture in the wall.

= When replacing individual or a small group of stone 'bricks' the following guidance should be followed:

DO...

- 4 Remove 'bricks' which have been deeply eroded, are seriously fractured or spalled.
- 4 Only remove damaged 'bricks' if the pointing is weakened and deteriorated. This way, the 'bricks' can be removed without disturbing the rest of the wall.
- 4 Turn the 'bricks' around if they are generally sound and the damage is cosmetic. Turning the bricks saves the job of finding replacement 'bricks' from the same source with the same dimensions.
- 4 Where new 'bricks' are introduced, they should come from the same source as the original or a similar local source. The new 'bricks' should be the same size as the originals.
- 4 Ensure that the new 'bricks' have the same dressing or finish as the rest of the wall.
- 4 Use a mortar mix which is six parts sand to every one part cement and one part lime.
- 4 Ensure that 'bricks' are laid so that the bedding planes of the stone are horizontal. This will ensure maximum resistance to the elements.

DO NOT...

- 6 Remove 'bricks' if erosion or spalling is only superficial and the 'brick' is otherwise sound. Loose material can be lightly brushed off.
- 6 Attempt to remove bricks until the mortar around them has weakened. The hammering out of mortar will damage the surrounding wall.
- 6 Remove 'bricks' which are perfectly sound.
- 6 Use non-local (or geologically different) stone, sawn stone, artificial stone or reconstituted stone. These materials look noticeably different from the local sandstone and would stand out from the rest of the wall.
- 6 Use standard size or 'off the shelf' stone 'bricks' as these will probably not match the original size and finish of the 'bricks' in the rest of the wall. Otherwise the repair will be obvious and spoil the appearance of the wall.
- 6 Use an inappropriate mortar mix, as this can damage the stonework and potentially encourage damp.
- 6 Use 'bricks' with a vertical or diagonal bedding plane. These will deteriorate much more rapidly than the rest of the wall and will need replacing before long.

The Repointing of Stonework - Best Practice

Whilst the stone 'bricks' that make up a wall can last indefinitely if well maintained, the mortar pointing between the stones is by nature temporary and will need renewal. The purpose of pointing is not to 'hold the bricks together' (a common misconception), but to help keep the stone dry by absorbing moisture, and to give the stone room to expand during warm weather. The action of moisture and the expansion of the stone means that pointing will deteriorate over time, but this deterioration means that the mortar is doing its job. Traditional lime mortar is softer than stone and is the ideal material for pointing, though hard cement-based mortar is becoming increasingly common despite this material being inappropriate, as it is harder than stone and is less permeable.



The mortar is of a sandy colour and texture and has been applied within the joints only to give a traditional look to the wall.



This smooth cement rich mortar contrasts with the stone of the wall. This is compounded by its application as strap pointing which stands proud of the stone.

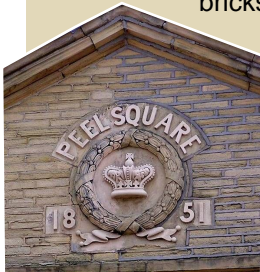
Pointing Finishes	
<p>Flush</p>	<p>Ribbon</p>
<p>Weatherstruck</p>	<p>Slightly Recessed</p>

DO...

- 4 Check the condition of the pointing every 4-5 years.
- 4 Only re-point where mortar has been weathered away, or where it is very soft or loose. Sound old pointing should not be removed. Even if the pointing is of a hard, cement-rich type, wait until it is easy to remove.
- 4 Carefully rake out defective pointing manually using a knife or spike to a depth of between 25mm and 40mm.
- 4 Use a mortar mix of six parts sand to every one part cement and one part lime. This will produce a mortar which is softer than the sandstone and visually complements the material.
- 4 Flush out the joints and beds with clean water before applying the new mortar with a pointing iron into the joints and beds while they are still wet.
- 4 Re-point as far back into the wall as possible, filling the vertical joints before the horizontal beds.
- 4 Ensure that pointing is either flush with or slightly recessed from the surface of the stone. This is the traditional detail. If the 'bricks' are weathered and no longer have a flat face, mortar should only be applied to the actual joint width and not onto the face of the stone.
- 4 Once packed in, new pointing should be swept with a brush to expose the aggregate of the mortar and the edges of the stones.
- 4 Hire builders or contractors who have experience in working with historic buildings and can provide local examples of good re-pointing. Agree a sample of the mortar to be used, if necessary.

DO NOT..

- 6 Allow the pointing to badly deteriorate, as this will allow moisture into the wall and can cause 'bricks' to become unstable.
- 6 Forcibly remove sound pointing, as this is likely to widen the joints and damage the stone. The pointing will deteriorate at different rates in different locations, therefore it is highly unlikely that an entire building or elevation will need repointing at the same time.
- 6 Use cement-rich mortars, as these will set harder than the stone. Cement mortar is less porous than stone, so moisture gets trapped in the stone and evaporates at the stone face, causing it to weather rapidly and over time leaves the pointing standing proud of the stone. Cement-rich mortar prevents the stone bricks from expanding when warmed by the sun, causing the stone to break up more quickly. In addition to damaging the stonework, cement rich mortar looks out of place, as it is often a grey or off-white colour which does not complement the colour of the stone.



- 6 Re-point with joint finishes such as 'strap' or 'ribbon' pointing as these are visually unacceptable and are modern details. Other effects such as 'weatherstruck' are not appropriate for historic buildings.



Pointing that is visually dominant against the natural stone.



Pointing style that enhances the natural stone.

- 6 Smooth off new pointing with a steel trowel. This will give a smooth edge which will contrast with the grainy texture of the stone.
- 6 Proceed with re-pointing if you are unsure or are not confident that your builder or contractor will produce the right result. Inappropriate pointing is damaging to the stonework of a building as well as visually poor. Once in place, it will be a few years before it can start to be removed. If in doubt, the Conservation Team can advise.

Stonecleaning and the Removal of Paint and Render - Best Practice

Generally the cleaning of stonework is discouraged for the following reasons:

- = Darkened stone is a sign of the age of a building and is evidence of the region's industrial history. The cleaning of stone robs historic buildings of this patina of age.
- = The cleaning of houses which form part of a group, such as a terrace, or forms part of an important view of the conservation area can strongly undermine the group value of the houses by creating unwanted and unnecessary contrasts between buildings which should have a harmonious appearance.



= The cleaning of stonework requires experienced conservators or technicians. If done incorrectly it can cause irreversible damage to the stone.

= Today's lower levels of air pollution mean that cleaned stone can take on a greenish tinge as the stone is colonised by algae rather than darkened by smoke.

However if traditionally bare stonework has been painted over or rendered, it would be appropriate to clean off these coverings. In these cases it is essential to hire an experienced professional who will carry out the job without damaging the stone or mortar. **As brochures and information provided by companies can be misleading, please contact the Conservation Team for advice.**

