

Brickwork

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INTRODUCTION AND DESIGN HISTORY

The guidance notes on brickwork are divided into two groups; repair of existing structures and the construction of new ones. The philosophy, techniques and materials are different in each case. However an appreciation of the historical context and in particular the use of materials is a prerequisite.



Detail of original brickwork showing Flemish bond and recessed pointing. The Lion badge was a plaque that certified that the house owner was subscribed to a fire insurance scheme.

Brick type

Bedford Park was built largely using red facing bricks produced locally in Acton, which were cheap and of very moderate quality. Some houses, however, were built in yellow stock bricks with red brick dressings and decoration. In many cases the

same design of house was built either entirely in red bricks or in yellow bricks with red brick detailing.

Mortar - general

Until the 20th century bricks were laid and pointed using lime mortar, a mixture of sands and lime, which hardens slowly by a chemical reaction with the air. Lime mortar uses a range of aggregate from coarse to fine, and this gives the mortar a gritty texture. Modern construction almost invariably uses a cement mortar, and the craft skills relating to lime mortar have been lost to the general builder. However the use of lime putty and mortars based on hydraulic lime has been reintroduced over recent years, largely in the context of historic building conservation, and the materials and specialist craft skills are increasingly available.

The original brickwork of Bedford Park is laid in a soft lime mortar, which was no doubt mixed using whatever aggregate was available. Few buildings in Bedford Park have escaped re-pointing in the 20th Century, so the prevailing pointing is with a cement mortar, often with a 'lightly struck' joint. See below for comments on pointing finish.

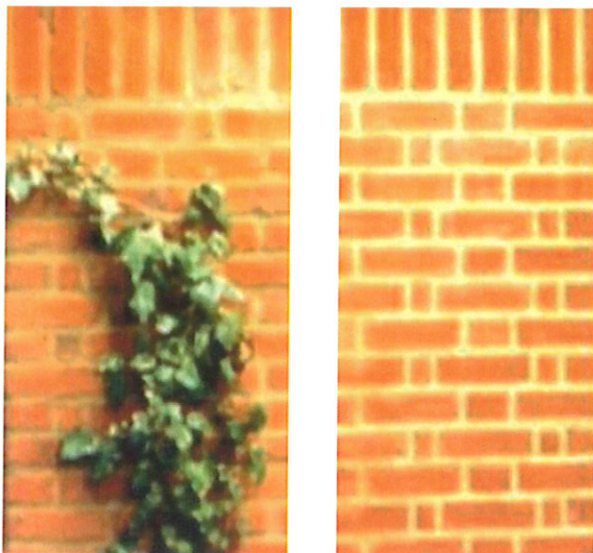
Lime mortar pointing allows the brickwork to 'breathe' to a far greater extent than cement mortar, and the use of lime mortar can enhance the control of damp in walls and extend the life of the bricks themselves. The reverse is true of a strong cement mix, which traps moisture in the wall, and which can cause the bricks themselves to erode at an accelerated rate.

Lime-based mortars are weaker, softer and more flexible than cement based ones, which can be highly beneficial in some contexts but they require some experience and specialist knowledge for correct specification and use.

If cement mortar is used in an existing structure built using lime, the cement mortar should be of a weak mix to reduce the differential of strength between the two. If lime mortar is to be used, specialist advice should be sought regarding the mix, as not only the ratio of lime to aggregate is important, but also the mix of different aggregates (sands). Advice can be sought from an architect with the relevant experience, or from a specialist contractor. It may be expected that the use of lime mortar becomes increasingly common, and there are real practical benefits as well as that of authenticity.

The appearance of pointing is particularly important; whatever materials are used, the mix and the choice of sands/aggregates dictates the all-important colour and texture, so it is strongly recommended to carry out a trial area and allow it to dry for inspection and approval before allowing work to proceed further. In many cases this is a condition of Listed Building Consent.

Colour should be a buff-grey, not too yellow. In cement mortars a dull grey colour usually indicates an excessive use of cement. In all cases, and especially when using red bricks, the surface of the bricks must be kept clean of mortar.



Pointing using similar mix but different aggregates. Left hand side preferable

REPAIRS AND ALTERATIONS

Brick types

The bricks should be carefully chosen to match those existing to the house in question.

Matching size can be simply assessed. The question of metric and imperial sizes is most important, and

the size of the original and proposed bricks should be compared. Bricks are available in metric and imperial sizes. Either can be used in separate construction, but if continuity is required with existing work the use of an imperial brick is highly desirable, as otherwise the width of the mortar joint will vary, or the coursing will not line through.

Colour and texture matching is both more important and more difficult. It is helpful to break a brick from the existing work in half to establish the un-weathered and clean colour. This can then be matched as closely as possible with either a new or a reclaimed brick.

The sourcing of reclaimed red bricks is difficult, as they are soft and the demolition and cleaning process often chips and damages them. Reclaimed soft red bricks are not usually in good enough condition, or available clean in sufficient quantities to be useful other than for patching. Sometimes bricks that have decayed on their outer surface can be carefully cut out and turned to reveal an un-weathered sound face.

There is some variation in the tone of red bricks from house to house, and the precision of the match is more essential in walls closely knitted in to the existing structure than with separate structures some distance from it.

A range of acceptable options is listed below.

In the case of yellow stock brickwork it is extremely unlikely that a new brick can be found that will give an acceptable match to the existing brickwork. The hardness of these bricks does make possible the use of reclaimed bricks, and there is a good range of reclaimed bricks available from many sources. Even this, however, is not straightforward, as there is a wide range of colours within the general specification. The stock bricks used to build Bedford Park tend towards the darker, warmer end of this colour range, with a high proportion of pink/purple colouring included, and samples should always be compared on site before a decision is reached. Many reclaimed bricks are marketed with paint and sooty coatings on them, and these should be avoided where possible.

Moulded bricks are available from several of the manufacturers of red bricks, and care should be taken to match the existing (see below). Profiles vary, although some are more commonly found than others. The range of 'standard specials' available from some manufacturers are seldom a good match. In reality the cost and delivery time for an exactly matching, purpose-made special does not greatly exceed that of a 'standard special'. Delivery times for either can be long, and orders should be placed as early as possible.

Alterations

It is sometimes considered important by conservation specialists to identify alterations such as the infill of openings, by recessing the infilling brickwork. This is a matter usually dictated by the specific Conservation Officer; as fashions have changed several times over the years and will no doubt continue to do so. More usually, alterations, like repairs, are intended to be as invisible as possible; often more difficult to actually achieve, and certainly more dependent on quality of workmanship.

Brick bond and mortar for repairs

The prevailing brickwork bond should continue through any repair or alteration.

Brickwork repairs and alterations should continue the characteristics of the surrounding work as far as possible. In re-pointing areas of original brickwork the case for using lime mortar is increasingly strong. Mortar mixes should be weak and soft, and as Lime mortar becomes more commonly used and available it should be seriously considered as an alternative to cement mortar. No cement mortar mix stronger than 1 part cement : 1 part lime: 6 parts sand is normally appropriate, unless there is a genuine engineering requirement for it, and a mix of 1:2:9 is preferable.

The use of a mixture of coarse and fine sand provides a gritty texture that approximates to that of the original lime mortar used in the 19th Century. If cement-based mortar is to be used, a usually appropriate mix for re-pointing comprises 1 part cement, 2 parts lime, 4 parts soft sand, 5 parts fine sharp sand.

Patching and pointing

The colour and texture of the pointing is at least as important as the choice of brick to the overall appearance of brickwork.

In carrying out alterations to areas of brickwork it is necessary to consider whether the rebuilt areas only should be pointed, or the whole area raked out and re-pointed to unify the appearance. The appearance of previously patched, altered or disfigured brickwork can be improved by careful re-pointing which minimises the difference in appearance of old and new work. Informed and skilled judgement should be sought.

Preparation

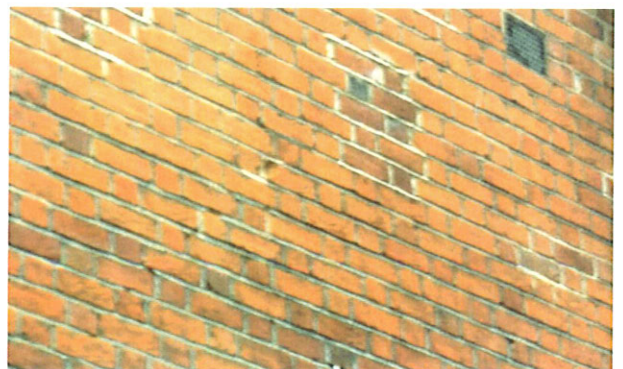
It is essential that the raking out of existing pointing is done carefully without damaging the bricks, and the use of angle grinders and power tools for this can be harmful and is seldom necessary.

Patching

If pointing of small patches only is to be done, it should be matched as closely as possible to the existing work. This is heavily dependent on the skill and attitude of the bricklayer, both in mixing and placing the mortar.



Ten percent patched with second hand bricks and fully repointed in 1:2:9 mix, lightly brushed



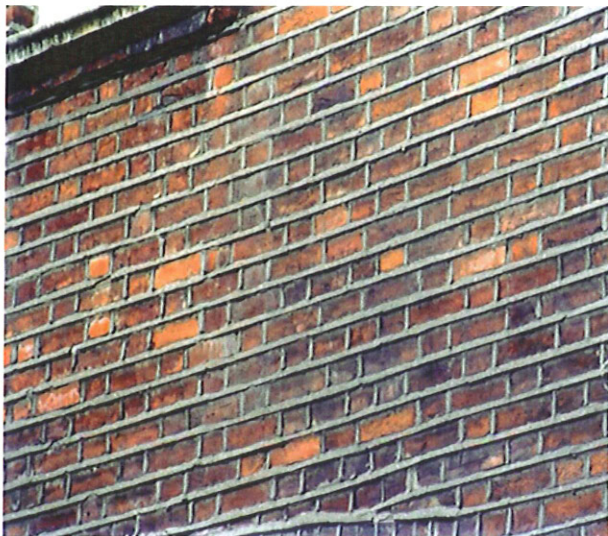
Poorly patched brickwork with new, hard cement pointing with struck finish contrasting badly with older brickwork

Re-pointing larger areas

When re-pointing large areas, or whole sections of the building, it is necessary to select the type of joint most appropriate. In all cases, and especially when using red bricks, the surface of the bricks must be kept clean of mortar. A sample panel is invaluable in setting the standard and appearance to which an area of brickwork is to be pointed, and is often required by the planning authority for approval under conditions of Listed Building Consent.

Appearance of joints

Irrespective of mix, pointing is the most problematic and therefore most important issue in the specification of new brickwork. Most bricklayers, left to their own devices, will finish the pointing with a "struck" joint forming a prominent and rather harsh appearance. This is generally inappropriate in Bedford Park.



Unsympathetic pointing in smooth cement mortar with heavily projecting struck finish

In some cases it is appropriate that the pointing finish is dictated by that existing to the rest of the building (which is seldom original). This is a matter of judgement, but it is never correct to extend and compound an incorrect appearance. Fashions and accepted practice have changed over the years and will no doubt continue to do so.

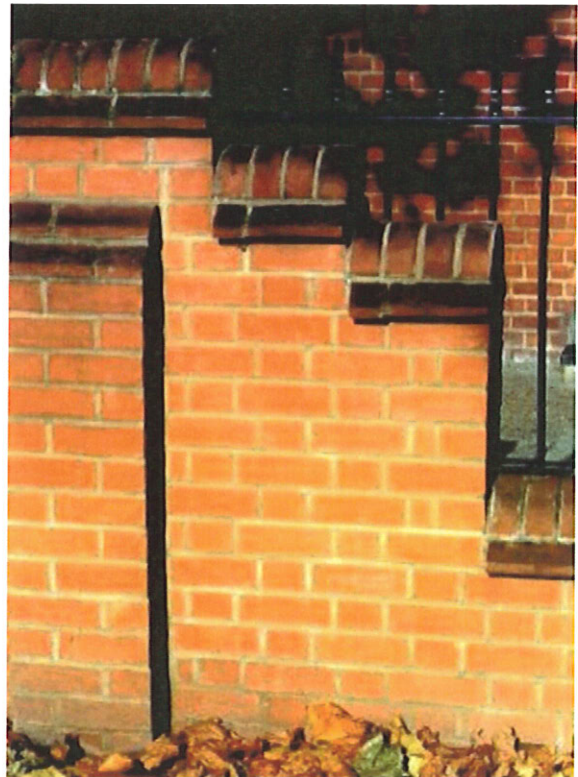
The pointing finishes presently considered acceptable are:

Flush pointing: Most successful with stock brickwork, due to its irregular texture. The joint is filled flush with the brick surface and cleaned off with a trowel, brush or bag.

'Bucket Handle': The joint is filled flush and then lightly recessed using a trowel handle, pointing iron

or a length of hosepipe. This produces a defined but not harsh joint, concave in section.

Recessed: The preferred option in most cases. The joint is filled almost flush with the brick face, but recessed just enough to expose and define the edges of the bricks. If correctly and skilfully done this can also expose the aggregate texture with a gritty finish. This can be achieved by forming a flush joint, and then brushing it back with a brass wire brush after the mortar has started to set. Examples can be seen in the parapets of St Michael and All Angels Church that were rebuilt in 1981, and the Studio building at 11 Bedford Road.



New fence wall in Charnwood Hampshire Red bricks with 1:1:6 mortar mix and 'bucket-handle' pointing

Brick cleaning

Unless brickwork has been painted or heavily patched, cleaning is seldom necessary to achieve a good appearance, and it can be detrimental in that it will destroy the patina of age. It is almost impossible to reverse the effects of inappropriate cleaning. It should be noted that brick cleaning is subject to listed building consent. Advice should be sought.

When it is deemed necessary, a skilled and experienced contractor should be used, as the effects of incorrect or misapplied techniques can be disastrous. Health and Safety issues should be taken very seriously. In all cases a sample/test area is desirable if not essential.

Various techniques are used:

Water washing: Gentle and slow. There are proprietary systems (eg Jos) which make this very effective without damaging the brickwork.

Acid washing: Some acids are stronger and more alarming than others. When brickwork is cleaned using acid, the colour is leached out of the mortar, which changes colour to a dead grey. Not all paint will respond to acid cleaning.

Abrasive blasting or grinding: The soft red bricks can be seriously eroded, and in all cases the surface texture will be changed. The softer bricks used for arches and mouldings will erode faster than the rest, and this usually dictates that abrasives are wholly inappropriate.

Other than for the removal of paint, cleaning is perhaps most appropriate in the case of heavily patched areas of brickwork, which can be improved by cleaning *prior* to re-pointing. In this situation the existing pointing should be removed before cleaning, and the re-pointing carried out afterwards.

NEW BRICKWORK

It is generally required in conservation areas that new brickwork should match the existing as far as possible in materials, and appearance. The construction of extensions and complete new structures should be sympathetic and harmonious with the original.

Bricks and bond

The choice of brick is no less important than for repair, and this is explained in Section A above. However, the use of metric sized bricks is often possible in distinct new construction without detriment.

Walls were originally built of solid 9 inch or 13 inch brickwork, laid in 'Flemish Bond'. When new walls are built in cavity construction, the same appearance is achieved using 'snapped headers'. 'English Bond' is sometimes found as an alternative in garden wall construction. The walls below palisade fences in 4 inch brickwork are in 'Stretcher Bond'.

Mortar and pointing

See notes above on mortar and pointing in the introductory section and in the repairs section.

In most situations of new construction a fairly weak cement-based mortar with lime added as a plasticiser is appropriate. A mix of 1:1:6 cement:lime:sand is normal, as a bedding mortar for laying bricks.

It is usual, and easier, to point new brickwork as the work proceeds using the same mortar for bedding and pointing. In large areas it can however be better to rake out the joints and carry out the pointing as a separate operation, as this allows better control of the mix and avoids a patchy appearance due to inconsistency between batches. There is no practical benefit in pointing new work with lime mortar unless the brickwork is also being bedded in lime mortar or if adjacent existing brickwork is being repointed in lime mortar.

The pointing of new work presents the same challenge as re-pointing areas of existing, as described above. Irrespective of mix, the type of joint is the most problematic and therefore important issue in the specification of new brickwork. Sample areas should be prepared as described above.

In some cases it is appropriate that the pointing finish is dictated by that prevailing to the rest of the building (which is seldom original). This is a question of judgement, but it is never correct slavishly to extend and compound an unsympathetic existing appearance. The pointing finishes presently considered acceptable are set out above.

DECORATIVE BRICKWORK AND DETAILS

Most of the houses in Bedford Park have decorative brickwork detailing to the front facade and other principal elements, in red bricks, with moulded profiles. The manufacture of moulded bricks demands that they are less thoroughly fired than standard bricks, which results in a softer brick. As a result the moulded bricks are commonly prone to erosion by weathering and frost action, particularly in exposed locations such as chimneys. Some bricks are more resistant to frost than others, (see appendix) and this is a consideration when selecting bricks for exposed work – chimneys, parapet copings etc.

The most common areas of detail are:

Brick arches: Usually arches to window and door openings are constructed out of standard bricks, with a very flat arch profile achieved by tapering the joints between the bricks. Occasionally a more elaborate and sophisticated effect is achieved using softer, smoother bricks cut to tapered shapes and 'rubbed' or fitted together with a very thin lime mortar joint. Both can be achieved in new work, and repaired in old work. Care should be taken to apply the detail appropriate to the case and situation.

Moulded bricks: As described above, these are more prone to erosion and damage than other details. Originally projecting details, cills, etc. would have been capped with a sloping surface of mortar, but this is often defective or missing. They can effectively be protected by neatly formed lead drips and weatherings. The use of such leadwork can allow the retention of damaged mouldings that would otherwise have to be replaced.



Brickwork cleaned and repointed in 1:2:9 mix, brushed back. Brick detailing well protected and finely pointed.

SUITABLE AVAILABLE RED BRICKS

Sussex Orange Sanded Facings (handmade)

Sussex Brick Co., Hastings.

Pale red colour, the best match both in colour and texture for most cases. It is not frost resistant, and tends to erode in exposed locations (chimneys, below d.p.c. etc). Special mouldings, gauged arches, etc. available. Available in metric and imperial sizes.

Guestling Red Facings (handmade)

Sussex Brick Co.

Similar to above, but darker in colour, and marginally more frost resistant. Specials etc. as above.

Swanage Red Handmade Facings Redland Bricks

Colour similar to Sussex orange, and equally good. Texture is more open, with pronounced folds and a slightly gritty surface. Frost resistant. Specials available.

Suitable for exposed locations, garden walls etc where a frost resistant brick is sought.

Redland Restoration Red Redland Bricks
Similar to Swanage above, but darker in colour (slightly purpley).

Micheldever Handmade Red Facings

Pale red, with good surface texture. Sometimes they are oversize, which can be a problem when patching/altering existing work. Not frost resistant.

Charnwood Hampshire Red

Slightly too pale and pinky for patching and alterations, but suitable when used in isolation. Surface texture slightly too smooth but acceptable. Frost resistant. Specials available.

Note:

The use of lime mortar is becoming more common and the availability of bricklayers skilled in it use is improving. The Society will update this technical note when appropriate. Residents or their contractors requiring further guidance should contact the Society.

This note draws on the knowledge amassed about Bedford Park houses by local expert practitioners and members of the Bedford Park Society, as well as accepted good conservation practice in building construction. They have been discussed and agreed with the Conservation Officers of the boroughs of Hounslow and Ealing. Whilst every care has been taken to ensure the accuracy of the contents of these technical notes, no responsibility or liability for any loss occasioned to any person acting or refraining from action in reliance upon any statement in the technical notes will be accepted by the Bedford Park Society, any of its officers or members, or any contributors to the technical notes.