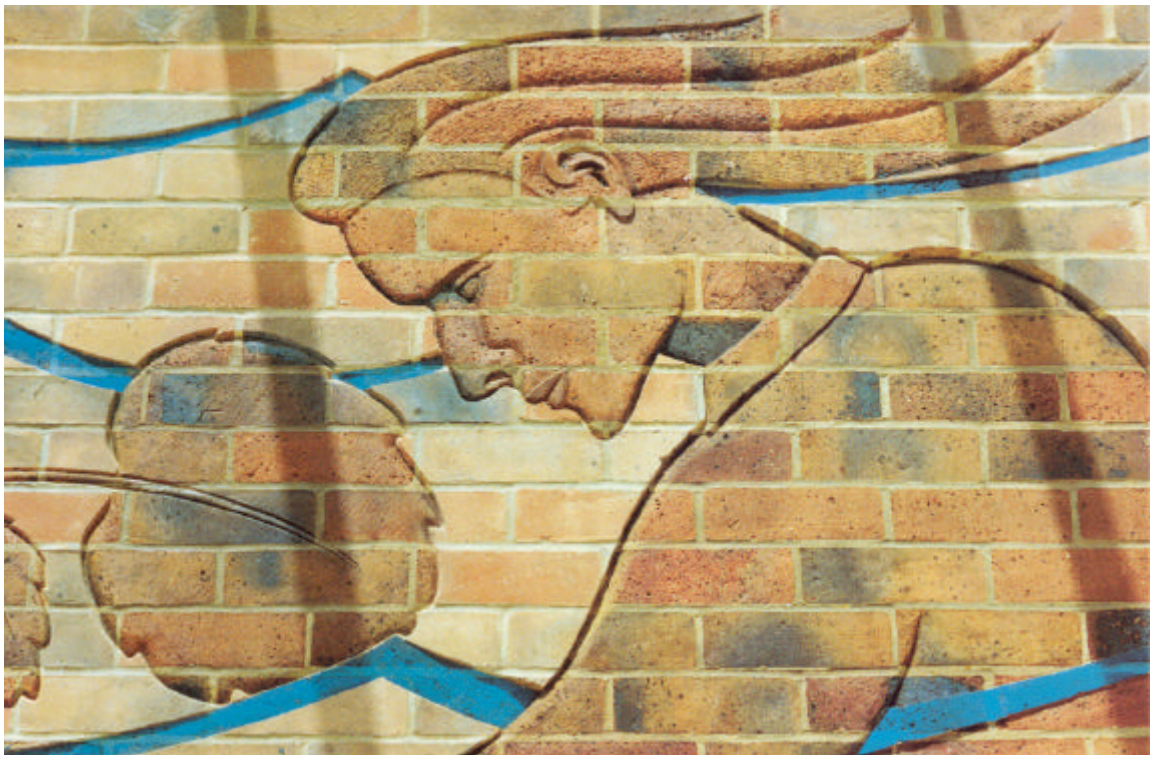
Cleaning of Clay Brickwork

Maintenance & Repair. No 4.1 December 2001



INTRODUCTION

This publication describes techniques which may be used for the cleaning of newly built brickwork, the surface of which has become disfigured either, by failure to observe sound site procedures as given in BS 5628: Part 3(1) and BS 8000: Part 3(2) dealing with aspects of workmanship or accidentally, e.g., by paint splashes.

Of course prevention is better than cure and the protection of incomplete brickwork should be carefully considered and implemented to avoid the need for often-costly remedial work.

Some of the techniques described may also be appropriate for the cleaning of older established buildings, but generally in such cases, the areas to be cleaned may be so large, or the nature of the deposits to be removed more complex necessitating involvement of specialist companies and equipment.

The importance of sound site practices to avoid the need for cleaning cannot be over-emphasised. Of particular relevance in this context is the protection of bricks and unfinished brickwork from excessive wetting by rain and snow. Failure to provide adequate protection will almost certainly lead to efflorescence and with certain types of brick may also produce iron and/or manganese staining.

Many of the stains encountered are much more difficult to remove once they have become 'fixed'. Where a stain is localised, for example mortar splashing, it should be removed as soon as possible. Normal cleaning of brickwork is the responsibility of the contractor and is usually carried out as a final operation before scaffolding is struck. Preparation and trials should be carried out well before the main cleaning operation. Trials should be carried out on limited areas of brickwork and once established as successful, work should continue at the earliest opportunity to avoid additional costs.

Effect of weather

Cleaning should not be carried out in frosty conditions unless adequate measures are taken to protect the wet brickwork from becoming frozen.

During hot weather it is preferable that brickwork to be cleaned should be shaded from sunlight, in order to prevent the areas being treated from drying out prematurely.

Identification of stain or deposit and masonry materials

Before commencing any cleaning operation, it is essential to identify the type of stain or deposit and the nature of the material to be cleaned. The latter is important because there are techniques that may be perfectly satisfactory for clay products but could damage other products.

The application of inappropriate cleaning agents can create further, more permanent discolouration, which can be extremely difficult to remove.

In the case of newly built brickwork, the brick manufacturer should be consulted at an early stage. Many manufacturers have detailed experience of the cleaning of their particular products, and may be able to identify the stain and to suggest cleaning techniques that have proved satisfactory.

It is important to distinguish between efflorescence and a stain. Efflorescence is soluble in water, whereas the stains considered in this note are not. It is strongly recommended therefore, that efflorescence be allowed to weather away naturally. Improvements can be seen over a short period of time, but with some products a longer period, over several seasons may be anticipated. (See section on white efflorescence).

Essential measures for chemical cleaning

When chemical methods of cleaning are to be undertaken, it is essential that the surface of the brickwork is first wetted. The wetting should continue until suction is reduced and the wall surface is just visibly wet.

On no occasion should a pressure hose system be used. This can lead to potential damage and may lead to an increased liability to efflorescence. An adequate supply of clean water must be available, and care must be taken to ensure that washings do not come into contact with other parts of the building.

Polythene or similar sheeting may be used to collect rinsing water and convey it away to a suitable container.

The chemical should not be allowed to dry out on the surface. Except where stated to the contrary, the brickwork surface should be thoroughly rinsed with water following treatment so that all trace of chemical is removed.

Site Safety Precautions

Cleaning small areas

Where the stained areas to be cleaned are relatively small, a suitable method is to wet down the area using a large paintbrush or spray bottle. The chemical treatment may then be applied to the stain using a paintbrush. Following the treatment, it may be necessary to scrub down the treated area with a bristle brush and water, with frequent cleaning of the brush, to ensure that the chemical is not left in the textured face of the brick.

STAINS AND DEPOSITS ON BRICKWORK

There is a number of proprietary branded cleaning agents now available, generally based on hydrochloric acid and the manufacturers' recommendations must be followed. These are available from local trade outlets.

Cement staining from mortar and concrete

Remove large deposits with wooden implements to avoid damaging the brick face.

Following the pre-wetting of the wall, treat the residue of mortar by careful application of a 10% hydrochloric acid solution using a paintbrush.

For lighter brick colours a 5% hydrochloric acid solution is preferred. The application of the acid breaks down the cementitious components but in the solutions suggested is not damaging to clay bricks.

On the rare occasions when a vanadium efflorescence is present, hydrochloric acid based cleaners must *not* come into contact with the efflorescence, otherwise a dark stain will result which will become fixed on the surface.



If the above method is not successful with coloured mortars specialist advice from the coloured mortar supplier should be sought.

If the sand used in the mortar has appreciable clay content, the clay may enter the brick texture.

It may be possible to remove it by applying hot soapy water. A scrubbing action may be necessary, but care must be taken with sand textured bricks.

Lime running



Such staining may occur on newly erected brickwork that has become saturated during construction. It may also occur under certain circumstances on established brickwork. It may come from mortar joints or from concrete and cast stone units that become saturated, and derives from free lime leaching out under excessively wet conditions.

When fresh, it may be removed by scrubbing using a bristle brush and water. If left exposed to the atmosphere, lime running hardens forming a crust, known as calcium carbonate.

In this condition acid treatment is likely to be required as for cement staining.



Dirt, grime, soot and smoke

Such deposits are generally the result of long-term airborne deposition and as such will be difficult to remove. Scouring powder and a stiff bristle brush may be effective if the texture is not too rough. Care should be taken with sand textured products. Some alkali detergents and emulsifying agents when applied by a steam cleaner have also been effective.

If these cannot be removed by scrubbing with hot soapy water, it is likely that the techniques used by specialist cleaning contractors will be required. This may involve cosmetic tinting to restore the original colouring.

Oil, grease and tar

The heavier deposits should be removed as far as possible by absorbent materials or scraping with wooden or similar implements to avoid damaging the brick face. An aerosol freeze spray can also be used for tar prior to chipping off.

The surrounding brickwork should firstly be wetted to avoid the spread of contamination. The deposit or stain should also be surrounded with absorbent material. This should be followed by application of a suitable emulsifying and degreasing agent in hot water. Stubborn deposits may require scrubbing with a bristle brush.

Ensure an adequate supply of absorbent material for collection of residues.

For deeper-seated stains, seek the advice of a specialist cleaning contractor.

Organic growths



Such growths occur naturally and impart a mellow weathered appearance to the masonry. They generally appear on brickwork which is permanently shaded from direct sunlight and which remains cold and damp for long periods of time.



Where it is necessary for such growths to be removed, the application of an algaecide will kill off the growths; these can then be removed by steam cleaning. The application of biocide will help to slow down any re-growth. Reference should be made to BRE Digests No. 370(3) and 418(4).



Paint and graffiti

Both are difficult to remove; hardened paint particularly so. Water-soluble paint removers to BS 3761(5) should be used in accordance with manufacturers' instructions.

Where the painted areas are extensive, or where the paint film is particularly stubborn, it will be necessary to seek specialist advice.

When using paint removers\strippers, care must be taken to prevent the rinsing waste water from entering the drains.

Paint removers\strippers are hazardous chemicals and care must be taken to ensure that all **Health & Safety** requirements are met.

It is essential to identify the nature of the stain as incorrect treatment can lead to problems and have an impact on other stains.

White efflorescence

Efflorescence is a deposit of soluble minerals, which may be left on the surface of the bricks and mortar when the wall dries out.



It derives naturally from clay brick and also from cementitious products or mortar. It can also be introduced as a contaminate, for example, from ground sources and from water or airborne transmission spray.

White efflorescence can occur following wet working conditions, when the building dries out for the first time.

Under certain conditions, it may reappear, to a lesser extent over several periods of weather cycles.

It should be allowed to weather away naturally, but brushing with a non-metallic bristle brush can accelerate its removal.

Care should be taken with sand textured products.

The deposit should be collected and removed so that it does not enter the brickwork at lower levels. In some situations cleaning with an industrial vacuum cleaner has been successful.

Any deposit remaining may be removed by using a clean damp sponge, which should be rinsed frequently in clean water. This will assist where efflorescence is experienced internally where natural weathering conditions will not occur.





Recurrent efflorescence on older established brickwork may almost always be taken as an indication that considerable quantities of water are entering the brickwork as a result of failure of weathering and other protective measures, faulty spouts and gutters and the like.

Chemical methods should not be used for the removal of white efflorescence.

Yellow or green efflorescences



Although rare, such efflorescences can occur on new bricks, particularly on some varieties that are buff or cream in colour. They are due to the presence of vanadium salts, a transitional metal compound and a naturally occurring ingredient of some clays. If brickwork exhibiting such efflorescences is washed with inorganic or proprietary hydrochloric acid based brick cleaning solutions, a dark coloured stain, which is permanent, is frequently produced, hence these

efflorescences should be allowed to weather away naturally.

If these efflorescences are so pronounced as to necessitate chemical methods of removal, the following methods have been used, but it is strongly recommended that initial trials be carried out on small areas of brickwork.



Brush on sodium hypochlorite or household bleach in concentrated solution, and, when bleached, apply washing soda solution (12g/litre) and leave on the wall.

For more persistent stains, brush on oxalic acid solution (100g/litre), and, when the stain is bleached, apply washing soda solution (12g/litre) and leave on the wall.

Remember not to clean other stains whilst vanadium salts are visible.

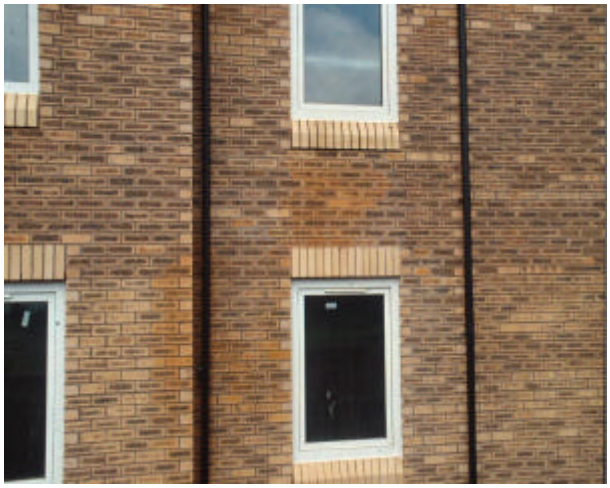
Iron staining

This can appear in several forms from orange through to dark brown in colour and can affect both the brick face and lead to surface staining of the mortar joint. Where in severe cases it is present on the brick face, it is best left to weather away naturally.



Iron staining will recede over time but the following techniques have found to be successful in removal of the stain.

Removal from the face of the mortar joint is best achieved by scraping or rubbing with a round file or carborundum slip. Where overall cleaning is required, the following chemical treatment has been found to be successful.



Brush on 5%-10% hydrochloric acid solution. This is frequently satisfactory on fresh stains. To this end, proprietary brick cleaners may be effective, but, as with all treatments, a small trial area should be carried out first. For more persistent stains, repeated application may be necessary.

Follow advice in ‘Essential measures for chemical cleaning’ & Site Safety Precautions.

Manganese staining

This is similar to iron staining but is generally dark brown or black in colour, and the treatment is similar. If chemical treatment is required the following methods have been used.



On fresh stains, brush on 5%-10% hydrochloric acid solution or a proprietary brick cleaner

In more severe cases a combined solution of hydrochloric acid (10%) and hydrogen peroxide (10%) can be effective or, alternatively, paint the stain with oxalic acid solution (100-120g/litre).





Staining of Blue Bricks

Staining of blue bricks is commonly called 'Peacocking'. It appears as an oil coloured type of stain on the face of the bricks and is a natural characteristic of these products.

The most common stain to blue bricks, similar in appearance to 'Peacocking', is associated with the saturation of bricks and brickwork prior to and during construction which leads to calcium deposits drying on the face of the bricks.

Good site protection to unused bricks and incomplete brickwork is essential to minimise, and in many cases, prevent this stain occurring.

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