



City of Westminster

PLEASE NOTE

The Unitary Development Plan (UDP) policies and planning, building control and other legislation and regulations referred to in the text of this guide were current at the time of publication. Because this guidance is an electronic version of the printed guidance as approved and adopted, these references have NOT been changed. For ease of contact; names, telephone numbers and locations have been regarded as non-material editorial changes and have been updated.

As UDP policies and government legislation may have changed over time, before carrying out any work, it is recommended that you consult the current UDP

<http://www.westminster.gov.uk/planningandlicensing/udp/index.cfm> for policy revisions and you may wish to check with planning and/or building control officers about your proposals.

FACADE CLEANING THE REMOVAL OF SOILING AND PAINT FROM BRICK AND STONE FACADES

FACADE CLEANING

THE REMOVAL OF SOILING AND PAINT FROM BRICK AND STONE FACADES



FOREWORD

The City Council has always been committed to the protection of Westminster's rich architectural heritage and the preservation of the character of this historic part of central London.

The Council's Department of Planning and City Development is continuing to produce a series of Planning, Design and Technical Advisory Guides, addressed to property owners, architects, developers and the general public, giving useful information on a wide range of aspects of development. These publications complement the relevant policies contained in the Westminster Unitary Development Plan, by elaborating on the policies' content, giving additional explanations on their reasoning and by guiding their detailed implementation.

The Council's commitment to Conservation aims not only to safeguard historic buildings from demolition or unsuitable alteration but also to minimise the effects of natural deterioration, often largely due to lack of proper maintenance in the past.

The cleaning of building facades can be an important aspect of the Conservation. In certain cases, it does not only improve the appearance of the streetscene but it can also be a vital measure of proper maintenance, which contributes to the 'health' and preservation of old buildings.

This Guide gives information and advice on this subject. The Council's officers will be happy to assist you with further advice and details which relate directly to your property.

Councillor Robert Davis
Chairman
Planning and Transportation Committee (1995)



This Guide does not recommend indiscriminate cleaning of all old buildings.

The City Council is fully aware of the natural ageing of facades gives old buildings a dignified visual maturity which is often as valuable as any other element of their historic appearance.

Even in case where ageing reveals marks of 'abrupt' change or old periods of neglect, cleaning is not necessarily recommended but may be appropriate, subject to specialist advice.

Unfortunately however, there are many cases where natural or 'man-caused' soiling and staining are clearly detracting from a building's character or even disfiguring an historic building or area.

Where such cases can be established, the City Council considers that facade cleaning can be a necessary part of good maintenance and an important measure of restoration.

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INTRODUCTION

Virtually the whole of the City of Westminster is covered with areas and buildings of very long and important history, reflecting the development and growth of London over the last two to three centuries. Approximately three quarters of the City is covered by designated Conservation Areas and well over ten thousand of its buildings are listed as of special architectural or historic interest. Their proper care and maintenance is essential for their preservation, which forms one of the main endeavours of the Council's planning policy.

Soiling of the exterior is one of the most evident characteristics of old buildings. It may often be a desirable manifestation of a building's age and history, but sometimes it can be a potential source of facade decay and even structural damage. While the cleaning of an historic or any old maintenance which, sooner or later, may have to be considered to be carried out.

This publication advises on factors which must guide a deciding on whether to clean a building, it explains the nature of the common causes of soiling and staining of facades and describes the main categories of cleaning methods and the types of case where these methods can be effective, if cleaning is necessary.

Part I of the Guide gives information on common sources of facade soiling and advises on precautionary measures which can minimise their effect.

Part II gives information on types of methods used commonly for the cleaning of facades, advises on their main advantages and disadvantages, and draws attention to measures that must be taken during the cleaning operation, and to essential works that must be undertaken after cleaning. This part also gives a summary of different types of cleaning methods and the type of facades for which each methods is generally appropriate.

Part III gives supplementary information and contacts for further general and specialist advice.

The information and advice in this Guide supplement the relevant policies which are included in Chapter 8 of the City of Westminster unitary Development Plan, elaborate on those policies and provide details for their implementation.

PART I THE IMPORTANCE OF ROUTINE MAINTENANCE IN MINIMISING THE NEED FOR CLEANING

The staining of a facade is normally the result of natural weathering of the brick or stone in the particular micro-climatic and other local conditions, in combination with the design and detailing of the building.

Uniform, not excessive staining due to natural weathering, is often harmless and represents an acceptable change in the appearance of a building over a long time of its life and history; furthermore, it can be seen as contributing positively to the character and appearance of an old building.

Most of the soiling and staining which is considered as aesthetically unacceptable and may even cause damage to a building, often originates from lack of regular routine maintenance and proper care. Soiling and staining of a facade can be caused by a wide range of combinations of different factors, from quality of materials, atmospheric conditions, and other local circumstances. The following recurring maintenance faults and other factors however, can contribute seriously to soiling and staining and can even become eventually the source of structural problems to a building:

1. Defective rainwater drainage.
2. Defective damp-proofing.
3. Defective pointing.
4. Painted masonry.
5. Corroding metal parts in the wall.
6. Atmospheric pollution.
7. Creeper plants and other organic growth.

These are explained in more detail in the next few pages.



Examples of persistent water saturation of brickwork and resulting staining.



1. Defective Rainwater Drainage

This familiar problem can easily cause almost permanently damp areas on a facade, behind or alongside defective downpipes, gutters, hopperheads etc. The visible results on the facade are unsightly patches or zones of stains, often marked with grey or white powdery or flaking lines or concentric rings. If parts of the facade are kept permanently saturated, salts will gradually be deposited inside cavities, recesses and pores in the masonry. As the wall dries temporarily between wet periods, salts crystallise and consolidate, especially in the periphery of a wet patch or zone on the facade, causing unsightly stains which will spread as the salts are partly dissolved by the next rain and new ones are deposited. Repeated crystallisation of salts will cause powdering and flaking of the masonry and, in time, serious decay.

In an aggressive environment, such as central London's, rainwater will carry not only dirt but also acidic substances. These will inevitably scar the masonry and cause serious progressive deterioration.

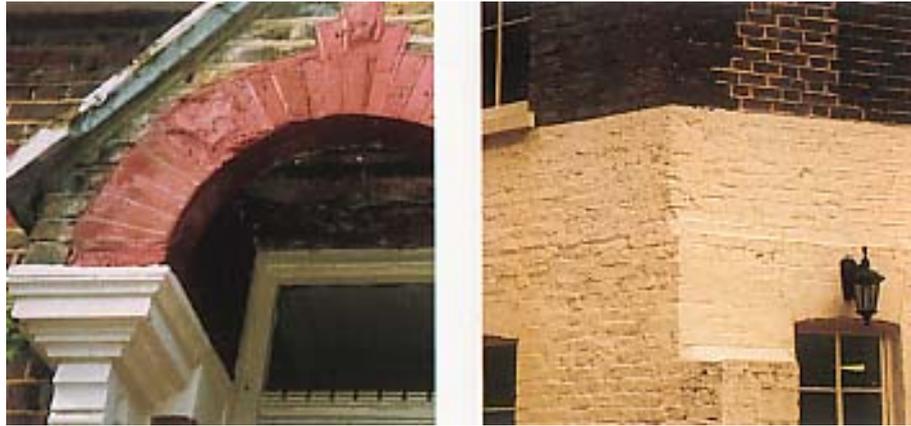
Perpetual saturation can also cause permanent staining, so deep within the masonry, that can be impossible to remove.

2. Defective Damp-Proofing and Other Sources of Dampness

Similar processes to those described above will take place with dampness rising from the base of a facade (if the damp-proof-course above the foundations is defective) or spreading around any sources of dampness caused by defective plumbing. Although the rising or spreading damp may not contain acidic substances, the results in terms of staining the facade can be similar to those described above.

3. Defective Pointing

Damaged or inappropriate pointing allows rainwater penetration leading to long-term saturation of masonry, with the same processes taking place as those described in Section 1 above. In this case, stains usually first appear on the upper part of each course of bricks. Defective joints between courses of stone blocks may lead to the same effect. Joints to parapets, cornices, string courses and other architectural details are most vulnerable.



For sometime, painting of masonry may appear to conceal defects and 'brighten' the appearance of an old facade.



Gradually the paint deteriorates, blisters and flakes, and the wall may be kept permanently damp. It may facilitate the development of serious infestation, which may need drastic treatment, or even replacement of timber parts of the building or parts of the wall.

4. Painted Masonry

One of the aims of this Guide is to cast out the common fallacy that painting masonry can protect it from the weather and can aesthetically improve the appearance of a brick or stone building. Modern exterior paints are designed to prevent the ingress of moisture but, if used on the solid walls of an old building they also prevent the evaporation of dampness which exists in the wall, either absorbed from the inside or, inevitably in time, finding its way through cracks from the outside, behind the paint, the moisture is trapped and will gradually increase. In hot weather, it will vaporise behind the paint film causing blistering; in cold weather the wall surface may be damaged by frost action. As the moisture content of the wall increases, so does the likelihood of decay. Timbers quickly succumb to wet or dry rot attack, bricks are likely to deteriorate and crack, and damp patches are likely to appear and spread on the walls inside the building.

The City Council considers that painting brick or stone facades is normally unacceptable and will be discouraged, even in cases where the Council's consent is not required. Exceptions may be made where special circumstances exist or for the painting of small parts, such as window stone sills and stone architraves, only if suitable stone paint and colours are used and only if such painting is appropriate for the preservation of the character of a building or area (for example, in cases where it can improve uniformity in the appearance of a street or terrace). Owners, who are contemplating painting the whole or parts of a facade, are strongly advised to contact the Council's Conservation officers, to establish whether such painting is appropriate and whether it requires consent.

In cases of brick or stone facades, which have been painted in the past, the Council actively encourages their cleaning and this Guide is part of the Council's effort to achieve this improvement. In some cases, especially concerning listed buildings; grants for the removal of paint may be available (see Section 14 of this Guide).

5. Corroding Metal Parts in the Wall

Metal elements included in the structure or decoration of a wall should be non ferrous; if they are ferrous (as they often are in old buildings), they should be kept dry and adequately protected from corrosion. If for some reason (e.g. defective water drainage in the structure) such parts have been exposed to water penetration, it may be necessary to treat them in order to cease the corrosion. If it is necessary to remove resulting stains, this should be done under specialist specifications and expert supervision. Long-term deep-seated stains may prove impossible to remove entirely but, to the degree that it can improve the appearance of the building, their cleaning may still be desirable.

This section of this Grade is also concerned with facade staining caused by corrosion of metals added to a facade, such as ornamental objects and brackets, nails or screws holding plant supports, and cable or pipe clips which might easily be avoided with better planning.

To prevent facade staining from such sources, it is important to avoid fixing ferrous metal parts on walls. Any such existing fixtures should, if they cannot be relocated, be replaced with non-ferrous ones. Any redundant nails, screws, brackets etc. should be carefully extracted from the wall and any resultant small holes should be repaired. If their removal is likely to damage the surface more seriously, it may be preferable to leave them in the wall and, if possible, protect them from further corrosion.



Examples of metal-corrosion staining on stone and brick.



6. Smoke, Dust and Other Atmospheric Deposits

It is impossible to avoid loose particles of dirt carried in the atmosphere being deposited on building facades. Dirt inhibitors in the form of colourless water-repellents are available for protective treatment of facades but their performance and long-term effectiveness have been widely questioned. **Water-repellents are not a substitute for good pointing and do not remove the need to cure any other sources of water penetration.** Experience shows that water-repellents can actually increase the incidence of water penetration and, where there is concentration of soluble salts, can accelerate decay. Even in cases where the application of water-repellents has kept masonry clean after facade cleaning, it may be found that their ability to repel water tends to deteriorate relatively quickly; also, their deterioration is rarely uniform and as a result, the appearance of a facade becomes patchy. Re-treatment is possible but is rarely carried out in practice, mainly for reasons of cost and frequency at which it should be undertaken.

As a practical precaution to avoid or control the staining of a facade by dirt carried in the atmosphere, it may be appropriate to undertake regular and thorough washing of the facade with low pressure water, concentrating on parts which are not exposed to the rain, and making sure that the dust or other loose dirt is washed down and away from the building and not deposited on lower parts of the facade. This measure is not adequate to remove any old staining formed by consolidate dirt or to cease or cure any processes of existing decay; it will however, if done carefully (and subject to the porosity of the masonry), keep a facade reasonably free of accumulation of loose particles of dirt and their eventual consolidation.



Dust and ordinary atmospheric dirt often causes uniform soiling, which sometimes may not warrant cleaning (other than, possibly, water washing).



Acid rain can cause unsightly discolouring of masonry and gradually serious erosion.



7. Creeper Plants and Other Organic Growth

Decorative creeper plants can enhance the appearance but, unfortunately, they can have some unsightly and destructive effects on facades and even on the structure and stability of buildings.

Creeper plants, such as ivy, can cause persistent dampness on a wall, they can dislocate rainwater disposal equipment, they can easily disturb eaves, copings, dwarf walls or roof coverings and they can even cause structural damage to foundations, walls, parapets and roofs. Most of these potential problems can, indirectly, cause serious facade staining, mainly by facilitating water penetration, as explained in section 1 above.

In addition, some creeper plants will, almost inevitably, cause damage to a facade, by scouring soft masonry surfaces, by causing persistent dampness (often deposited in the wall by secondary roots) by secreting acidic substances through their suckers and tendrils and by leaving dead roots, off-shoots or branches attached firmly to the facade.

Other organic growth, such as lichen, algae and moss may sometimes be structurally harmless, but can be unsightly if growth on building facades and may leave permanent stains. The opposite may also be true; some types of small-seed growth may not cause visible staining but, in time, can cause damage to stone.

In order to establish whether an existing type of organic growth can cause damage to a specific building, and to select the appropriate way to remove such growth, owners would need to obtain specialist advice, in the first instance from the Council's Conservation officers and, if necessary, from English Heritage experts.



An example of the possible undesirable effects of creeper plants on the

mortar and on the overall appearance of a facade.



Example of organic growth, which can be visually undesirable although it may be practically harmless to the wall.



On well-maintained traditional materials of good quality, uniform natural soiling is often a valuable element, which complements the historic character and appearance of a building. Cleaning in such cases is inappropriate and undesirable.

PART II METHODS AND PROCEDURES OF FACADE CLEANING

8. Matters to Consider Before Cleaning is Undertaken

This part of the Guide gives general information about the cleaning of stone and brick facades and the nature, procedures, advantages and disadvantages of the main categories of cleaning methods currently available. For specific applications, this information must be supplemented by specialist advice, as it may be necessary for individual buildings.

Although this Guide indicates that certain methods are generally suitable for buildings in Westminster, it cannot provide for specific historic, architectural, technical, environmental or other circumstances, which may prevail in respect of individual properties. The suitability of cleaning

methods and procedures in respect of individual cases can only be confirmed by on-site inspections and trials on all the substrate and soiling types that may exist on a specific building. Therefore, the City Council will not accept responsibility for any unsuccessful operations or damage to any specific cases where this information may not apply.

For all individual facade cleaning projects, owners are recommended to seek specialist advice from the Council's Conservation officers in the first instance (see contacts at the end of this booklet), from specialist firms and from 'English Heritage', in order to answer the following preliminary questions:

1. Is facade cleaning necessary and/or desirable in this case?
2. What are the substrates and the soiling, and what method of cleaning is appropriate?
3. What additional works may have to be considered, and what measures must be taken in connection with the cleaning?
4. For how long will the building stay clean, and what maintenance is required in the future? Has the building been cleaned before and, if yes, what has the effect of the cleaning been?
5. Are there any grants available for facade cleaning?
6. Is the City Council's consent required?

The following sections given general information on these questions.

9. Necessity/Desirability of Facade Cleaning

Cleaning of facades can be undertaken for aesthetic reasons or for the protection of the building, or both. Heavy soiling can sometimes detract from the appearance of a building by altering the natural colour of stone or brick and by obscuring ornamental or other details. On the other hand, the 'weathered' appearance of facades is part of a building's character and sometimes even reveals parts of a building's history (for example, by possibly distinguishing between original parts and later additions).

However, soiling on a brick or stone facade can be much more than an aesthetic problem; heavy soiling in particular can easily hide structural defects (such as deteriorated pointing, local fractures or even major structural cracks). Depending on the amount and the nature of the accumulated substances, heavy soiling can also cause damage to detailing, decay to bricks and stone and eventually, serious structural problems for the whole building.

Natural soiling is not the only reason that can cause these problems. The vast majority of historic or modern bricks will suffer in the same way if they have been painted, and painting can sometimes cause serious decay and structural problems to stone facades. Similar treatments, such as anti-graffiti or water-repellent coatings may also induce damage. Unless there are very special reasons, the City Council generally discourages all forms of painting and coating of brick or stone walls and, in cases where consent is required, applications for such works are normally refused.

More often than not, the decision to clean a facade will require advice from specialist Council officers and sometimes structural engineers and specialist contractors. In the first instance, please contact the Council's Conservation officers, whose telephone numbers are given at the end of this booklet and who will advise you also on whether Listed Building Consent is required in an individual case.



The City Council will discourage the cleaning of historic buildings whose character and appearance clearly benefit from uniform natural soiling. Applications for Listed Building Consent in such cases, will be refused. Equally strongly however, the Council will encourage facade cleaning in cases where the appearance, character or 'health' of the building will undoubtedly be improved.

The City Council takes the view that, in principle and unless special circumstances suggest otherwise, cleaning should be undertaken only in the following cases:

- Where soiling is clearly disfiguring the building.
- Where heavy encrustations are marring or obscuring architectural detail.
- Where unwanted paint is to be removed from masonry.
- Where soiling is concealing damage or decay and cleaning is necessary to expose the full extent of the problem, and where heavy soiling/encrustation itself is likely to generate damage or decay.



An indicative range of stone and brick facades, each within its own type and degree of soiling and staining. In each case, the decision whether to clean must be based on an individual set of criteria.



Where natural ageing enhances the overall appearance of an old building, the decision 'not to clean' is obvious and easy; Often, the question creates a difficult dilemma; In many cases cleaning is unavoidable.



Painting of brickwork must not be considered as an alternative to good maintenance or to the proper cleaning of a facade.



Before and after facade-cleaning

10. Different Methods of Facade Cleaning

A great variety of types of stone, brick and other building materials have been used in Westminster throughout the City's long history. Different methods of cleaning are appropriate for different buildings, depending on the design, quality, condition, building methods and design characteristics of individual facades and, of course, on the nature, distribution and amount of the soiling. It is possible that in certain cases, a number of different methods may have to be applied for a safe and effective cleaning.

Advanced knowledge and experience in the last few decades have resulted in a considerable range of detailed methods and specifications for brick and stone cleaning. This part of the Guide gives a brief account of types of methodologies - rather than particular specific methods - as a basic background knowledge, to enable members of the public to understand better the nature and extent of problems involved and the kind of necessary action, and to communicate effectively with specialist adviser or contractors.

The cleaning systems outlined below have been grouped into categories on the basis of the type of means/action employed for the cleaning, and have been selected on the basis of general suitability for types of facades that are common in Westminster. The accompanying information mentions briefly the basic technology and the advantages and disadvantages of each system.

Section 12 of this Guide lists the basic precautions which must be taken before cleaning works begin and Section 13 advises on additional works that must be undertaken after cleaning has been completed.

Owners or occupiers of listed buildings who wish to undertake facade cleaning, are reminded that cleaning works on such buildings will require Listed Building Consent, that they must submit an application to the City Council for this Consent and that works must not start before Consent is formally granted.



An example of the type of stains which may appear on a 'cleaned' facade if inappropriate methods or procedures of cleaning are applied.

10(i). Water washing

This is one of the simplest ways to remove dirt from the surface of masonry. It is particularly effective on limestone facades, as soiling on limestone is normally water soluble. On other building materials such as brick or sandstone, water washing can produce considerable improvements but may not achieve complete cleaning.

Water washing is usually done in two main stages; the first involves spraying water on the surface to soften the accumulated dirt, and the second washing the dirt away using again water (often with the help of chemically neutral soap and brush or a low pressure water lance). For light soiling e.g. physical accumulation of dust and superficial surface staining, this method can be easy, relatively cheap and effective if it is used carefully (i.e. without using excessive pressure, excessive volumes of water which can penetrate the structure or even stain the surface, and without using metal brushes or other coarse abrasives which can physically damage the stone or bricks).

The disadvantage of this method (again depending on the nature of the soiling, the porosity of the materials, etc.) is that it may prove to be relatively ineffective. Despite the simplicity, it needs to be carried out by specialised and experienced operators, in order to control the amount and pressure of water used, to select any supplementary techniques that may be necessary on a particular building and to apply skill and care when rubbing the wet surface of the facade. Most probably, at no other time in its life a building is subjected to such concentration, quantity and possibly pressure of water, as during washing.

It is essential that, before washing begins, any open joints, cracks, junctions with window frames, and any other potential water penetration points, are carefully sealed, and 'emergency' repointing may have to be undertaken.

Water penetration can cause new straining, can seriously damage the mortar between bricks, it can cause corrosion of hidden iron-cramps and deterioration of existing cracks in the bricks or stone. Also, it can affect timber plates or other unprotected timber inside a wall and even generate serious structural problems.

For individual buildings, a specialist contractor or adviser will recommend the most appropriate type of jets or other spraying mechanisms, to achieve even wetting of the surface of the wall in order to soften the dirt or dissolve any soluble binding matter and to apply the right water pressure for the removal of the softened unwanted material, using the minimum necessary quantity of water. This method is normally not effective for the removal of paint unless the paint is already clearly loose.

Special care must be taken when pressure-water or brushing is used, to avoid damage to brickwork or soft stone.

Variations of water-washing cleaning are based on the use of different pressures and temperatures, the use of water in steam form and the different equipment which can adjust the targeting and the amount of water during the cleaning process ('pulse' system). In some cases it may be appropriate to use neutral pH soap in order to improve water washing (see references in Section 11 of this Guide).

On the whole, the City Council does not discourage owners to water-wash facades, if this is appropriate for a particular property and done under specialist guidance and supervision.

10(ii). Mechanical (dry abrasive) cleaning:

In principle, all cleaning methods under this system involve use of different types of 'scraping' means; in effect these methods involve, to a greater or lesser extent, the physical removal of the surface of the brick or stone, together with the soiling or unwanted paint.

This considerable disadvantage becomes even more serious on facades with decorative or other three dimensional detailing which can easily be drastically altered or mutilated by these methods. The major of them involves the use of power tools with rotary or orbital heads using wire brushes or abrasive disks, or blocks which remove the masonry surface.

Abrasive cleaning can sometimes be done by hand, with the use of special 'carborundum' blocks. Although the effect of such cleaning is not as destructive as its power-tool equivalent, it still involves the removal of the outer surface of the stone or brick; it is also very time consuming and can be very expensive.

Other disadvantages of the mechanical dry cleaning system are that the necessary power tools are usually noisy and they create excessive amounts of dust.

The City Council normally discourages the use of dry mechanical facade cleaning methods, because of their destructive effect. In very special cases such as facades which are already badly damaged and which must be thoroughly cleaned or de-scaled before being restored or, as a last resort, where staining is so advanced that any other method would be ineffective, these methods may be appropriate. Even then, they should normally be limited to flat surfaces or, at most, to facades with large-scale simple detailing.

Abrasive dry cleaning should never be undertaken without specialist advice and approval and the Council strongly discourages owners from contemplating this type of cleaning as a 'D.I.Y.' operation. Extreme skill and care is required in the application of these methods, to minimise their destructive effect.

10(iii). Air/abrasive cleaning:

These methods involve a jet of compressed air containing abrasive particles, blasted through a hose and gun onto the wall. The forceful impact of the particles breaks and removes the soiling, inevitably together with the outer surface of the brick or stone. A range of sophisticated equipment and abrasive 'grains' are

available for use, the choice depending on the type of building materials and the detailing of specialist buildings.

Air/abrasive techniques differ from the mechanical methods described above, in that they use 'percussion' rather than 'scouring' action and thus they are arguably easier to control by targeting it more precisely onto parts of the facade.

However, as with the dry mechanical methods, the success of air abrasive techniques depends directly on the operators' experience and ability to distinguish between soiling matter and brick or stone surface while cleaning is underway, and on their dexterity. Some sophisticated techniques are more sensitive than others, and in the experience of the Council's officers, their use has been satisfactory in several cases. Nonetheless, the result of air/abrasive cleaning is the removal of the masonry surface. **For this reason the Council will discourage its use, except in extreme cases, as exemplified under 10 (ii) above, never without specialist advice and supervision, and not without on-site trial demonstration that the selected type of abrasive particles and the technique of application, are suitable in a specific case.**

Particular attention is drawn to the fact that certain types of abrasives or 'grains' used in modern abrasive and blasting methods, may contain health hazardous substances which may require use of sophisticated protection equipment. For this reason also, specialist advice should always be sought before these methods are used. The City Council's Environmental Health officers, whose telephone number is given at the end of this booklet, should be consulted on this matter.

10(iv). Water/abrasive cleaning:

This is a development of the air/abrasive cleaning methods, adapted to include water into the air/abrasive stream. Water is introduced either with the use of a 'wet-head' with one or many small jets spraying the surface simultaneously with the abrasive action of the 'grains', or by mixing the water with the abrasive particles and blasting the mix on the surface through the same nozzle.

The main advantages of the water/abrasive techniques are:

- (a) Water softens water-soluble soiling and facilitates its removal.
- (b) The water controls the dust which would be generated if dry air/abrasive cleaning was undertaken, and;
- (c) Because of the rinsing action of the water, it is easier for operatives to see the progression of cleaning and to control the operation more effectively.

As all methods of cleaning, water abrasive techniques require extreme care and attention to avoid unnecessary removal of the surface of the material. Again, the success of this type of cleaning depends on the operators' experience and ability to distinguish between soiling matter which has to be removed, and the surface of the brick or stone which should not be damaged unnecessarily.

The rinsing action of the water which controls the dust, does not reduce the need for protective measures to be taken to safeguard health and safety. Although practically no dust is generated, the mist which is formed instead contains masonry particles, soiling and abrasive, and is also a hazard with its own health and safety considerations and requirements. Expert advice must be obtained before cleaning is undertaken, in respect of protection of the operators, users of the building and the general public, and the Council's Environmental Health officer should be contacted before work starts.

The sludge of masonry, abrasive and water, which is generated during wet abrasive cleaning, is not partly rinsed by the water which is used for the actual cleaning process. The sludge which remains on the wall, the scaffold and on the ground, must be rinsed away completely before it hardens, and it should be prevented from being washed into gullies and surface water drains.

Overall, despite its advantages over dry air/abrasive methods, water/abrasive cleaning involves considerable mess and hazards, it requires equally high experience and skill and should not be undertaken without expert advice and supervision.

10(v). Chemical cleaning:

Chemical methods are based on the use of chemical substances to soften or dissolve the soiling, which is subsequently washed away with low pressure water.

Depending on whether the chemical substances used to soften or dissolve the soiling are acidic or alkaline, different types of chemical cleaning processes are sometimes referred to as acidic or alkaline methods. However, techniques using alkaline chemicals to break down the soiling, require also the use of acidic chemicals afterwards, to neutralise the alkaline agents used.

Cleaning chemicals are available in liquid or gel form, requiring different techniques of application.

For practical purposes, one chemical technique - known as the poultice method - is often referred to separately. Although in principle it constitutes ordinary chemical cleaning, the poultice method is based on a different set of procedures of application and, as a result, in some cases it may have a number of practical disadvantages.

A brief outline of these types of chemical cleaning is as follows:

10(v)(a). Acidic and alkaline (chemical) cleaning:

These methods use acidic or alkaline chemicals to soften or dissolve soiling or paint, which is then washed away with water. They should be selected for use, only after an assessment/analysis has been made of conditions on a building, concerning the physical and chemical nature of the soiling and of the type of stone, brick, mortar and other materials, and after trials have been made on-site, to establish the most appropriate chemicals and processes to be employed. If this assessment is not done or if it is not accurate or if it is not taken adequately into account by the operators, the facade may be left uncleaned, permanently stained or physically damaged.

Methods using alkaline chemicals to dissolve the soiling require pre-wetting of the surface, and the use of acidic substances after cleaning to neutralise the alkali; this must be followed by thorough rinsing of the surface with water.

These methods use concentrations of chemicals which are potentially dangerous to health and can easily damage most surfaces on accidental contact. It is important to use proprietary brands of known and consistent concentration rather than preparing them on site. Even when using ready made brands, the following potential dangers exist:

Health and safety risks to the operators of the method as well as to the public, if appropriate measures, specifically worked out for an individual project, are not taken. These risks can only be overcome with the involvement of specialist contractors and supervisors. Although all cleaning methods involve risks to health and safety, chemical methods require exceptionally high care in their application because of the direct and very serious potential dangers they involve.

Risk of permanent damage to the facade as well as other parts of the building (such as glass, timber etc.) if protective measures have not been specified adequately or are not adhered to effectively. While the City Council acknowledges that virtually all methods involve such risks, this Guide draws attention to the very particular degree of experience and care which specifies, operators and supervisors must apply in respect of chemical cleaning.

The main advantage of chemical cleaning methods is that, if they are undertaken by experienced specialists, they can be highly effective. Chemical cleaning is highly versatile and adaptable to specific requirements of individual buildings, by careful analysis of conditions, on-site trials, and adaptation of the specifications accordingly.

For the chemical removal of paint, solvent-based or alkaline-based strippers are available, suitable for different types of paint. Surfaces **must** be neutralised after the use of alkaline strippers, by the use of acidic neutralisers.

For listed buildings, detailed specifications will need to accompany applications for Listed Building Consent for cleaning, regardless of the method which is to be used.

10(v)(b). Poultice (chemical) cleaning:

This is a cleaning method which, because of its special technique of application, presents important differences from other chemical methods and has considerable advantages.

The poultice method involves the use of the same types of chemicals as the methods outlined above. The chemicals used for poultice cleaning however, are contained in concentration into absorbent 'packs' in poultice form, many of which are clay based. The poultice is applied on the facade by trowel or spray and must be left to act for precisely the right time as determined by the analysis or by trial applications. The poultice method gives a high degree of control over the duration of action and over the targeting of the chemicals onto detailed parts of the facade.

The principles of poultice cleaning are the same as those of the other chemical methods. The soiling is softened or diluted by the chemicals contained in the poultice, and is drawn away from the surface removing (much of) the soiling. The facade is then washed down with low pressure water. If necessary, the process can be repeated until the cleaning is satisfactory.

Although the poultice can be made to contain mild concentrations of chemicals, proper care must be taken when this method is applied, to protect the operators and the public from any hazardous effects and to avoid damage to property.

The main advantage of this technique is that the poultice holds the chemicals on the surface of the wall, in contact with the soiling, thus restricting considerably their ability to be absorbed into the stone or brick. Because of this advantage and because it offers a high degree of targeting of action, the City Council does not normally discourage owners from using poultice cleaning on brick or stone facades in appropriate cases, provided that cleaning is necessary and that it is done after specialist advice and carried out by specialist operators.

Poultice cleaning is more commonly used on heavily soiled limestone and sandstone surfaces as well as on relatively even-faced bricks. In the Council's experience, it has been used satisfactorily in a number of cases for the removal of paint from brickwork.

As with other cleaning methods, Listed Building Consent is normally required for poultice cleaning of listed buildings.



Dry abrasive cleaning can result in loss of the hard outer surface of brick and/or loss of detail.



Eroded brickwork - especially decorative detail - must be properly restored and repointed before cleaning. Pointing must be checked before and after cleaning and, if necessary, repaired.



Removal of paint from brick-facade (trial-sample) carried out with the poultice chemical method.

11. Appropriate Cleaning Methods - A Practical Summary

It has been repeatedly emphasised in this Guide that the selection of an appropriate cleaning method for a particular building is a complex process and that the City Council strongly discourages decisions without expert advice. The Council would also discourage owners from passing the responsibility of a decision on to cleaning contractors, without providing them with the necessary advice and detailed specifications prepared by a specialist.

The following cleaning methods have been found to be appropriate in many cases for the materials shown but their suitability for a particular building may depend on local circumstances and on the application of the appropriate procedures and skills:

Sandstone:

Abrasive cleaning (see Sec. 10(i) to 10(iv)).

Alkaline chemical cleaning (see Sec. 10(v)(a)) followed by neutralisation with acetic acid or hydrofluoric acid-based chemicals. Chemicals can be used in liquid or gel form or in poultice packs (see Sec. 10(v)(b)).

Hydrofluoric acid cleaning (see Sect. 10(v)(a)).

Manual abrasion (for hard sandstone) using carborundum abrasive blocks (see Sec. 10(ii)).

Limestone:

Water washing (see Sec. 10(i)).
Washing with neutral pH soap (see Sec. 10(i)).
Air abrasive cleaning often in combination with water washing (see Sec. 10(iii)).
Alkaline chemical cleaning (see Sec. 10(v)(a)) in liquid or gel form or poulticing (see Sec. 10(v)(b)) followed by neutralisation with acetic- acid chemicals.
Hydrofluoric-acid-based chemicals must not be used on or be allowed to run onto limestone or other calcareous masonries.

Polished Granite:

High pressure water or warm water and neutral pH soap.
Alkaline and acetic chemical cleaning (not hydrofluoric) (see Chemical Cleaning).

Unpolished Granite:

Abrasive cleaning (see Sec. 10(i) to 10(iv)).
Alkaline and acetic or hydrofluoric acid cleaning (see Chemical Cleaning).

Marble:

Water washing (see Sec. 10(i)).
Poulticing with attapulgate clay (see Poultice Cleaning).

Slate:

Water washing with neutral pH soap (see Sec. 19(i)).
Air abrasive cleaning (see Sec. 10(iii)).

Terracotta and Faience:

Washing with warm water and neutral pH soap (see Water Washing).
Alkaline chemical cleaning (see Sec. 10(v)(a)) followed by neutralisation with acetic acid or hydrofluoric acid-based chemicals. Chemicals can be used in liquid or gel form or in poultice packs (see Sec. 10(v)(b)).
(See notes on fireskin or glaze, below.)

Brickwork:

Water washing with 'pulse' system (see ref. under Water Washing).
Washing with warm water and neutral pH soap.
Washing with low-volume low-pressure water lances (sound, tough bricks only).
Alkaline chemical cleaning (see Sec. 10(v)(a)) followed by neutralisation with acetic acid or hydrofluoric acid-based chemicals. Chemicals can be used in liquid or gel form or in poultice packs (see Sec. 10(v)(b)).
Mild abrasive cleaning (only in special circumstances).

Notes:

For the removal of paint - *solvent-based or alkali-based strippers are available, suited to different paint-types. Surfaces must be neutralised after use of alkaline strippers.*

Sand-and-lime mortars - *can readily be damaged by hydrofluoric-acid-based chemicals. These must not be used on such mortars and they must not be allowed to run onto them.*

Firskin or glaze - *can easily be destroyed or damaged by any form of abrasive cleaning.*

Terracotta and faience - *should only be cleaned if it is absolutely unavoidable.*

Alkaline chemicals - *must not be used without neutralisation after cleaning.*

12. Additional Necessary Works and Precautions

Almost invariably, the following additional works are necessary when facade cleaning is carried out on a brick or stone building (all to be decided and carried out under expert advice and supervision). (See also references to necessary precautions under the different methods of cleaning, in this Guide.)

Check condition of mortar/pointing before cleaning and protect if necessary, especially if high pressure spraying or hydrofluoric-acid based chemical are to be used. Repair mortar/repoint after cleaning, as necessary.

Adequately protect any drainage equipment likely to be affected, especially open vents, gullies and inspection chambers/manholes. If chemicals are to be used, it is highly advisable to prevent them from finding access to the drainage system, especially in high concentrations.

Adequately protect pets, trees, plants and garden soil from the effects of chemicals and high pressure spraying.

Satisfy yourself through your professional advisers that adequate measures will be taken for the protection of the operators of the chosen cleaning method, for the protection of the building, or nearby buildings, vehicles, and other property, for the protection of people using the building and for the protection of the public.

Satisfy yourself that all necessary statutory approvals have been sought and obtained, such as Listed Building Consent, Building Regulations approvals, Health and Safety approvals (Control of Substances Hazardous to Health Regulations 1988) or others as may be required. In the first instance, check with the relevant Council officers whose telephone numbers are given at the end of this booklet.



Protective equipment during application of wet-abrasive cleaning.



DANGER SYMBOLS

(After, Nicola Ashurst: *Cleaning Historic Buildings*' Donhead 1994, Vol 2, p168)

One or more of these symbols will be found on the packaging of chemical cleaning and coating removal products.

13. Maintenance After Cleaning

If the cleaning method has been chosen and carried out correctly, a cleaned facade should be expected to remain relatively clean for decades, depending on the type and quality of masonry, the architectural detailing, local environment, atmospheric conditions, etc. A number of water repellent substances are available in the market for treatment of cleaned facades, but are expensive and their active length of life as dirt inhibitors may not justify this initial expense. It should be noted that such protective substances may prevent proper 'breathing' and may change the colour of the cleaned surface. The City Council would not normally allow the use of such protection to cleaned facades unless there are good reasons why this should be done, and it can be demonstrated that the building will not be adversely affected (**Listed Building Consent will normally be required in the case of listed buildings**). Instead, it is suggested that cleaned facades can be kept clean by regular and careful water washing.

Painting brickwork does not constitute good maintenance.

Paint prevents the evaporation of dampness from the wall. In the longer term it 'blisters' and 'flakes', it can cause frost-damage to the bricks and it can even generate dry-rot and other infestations.

Painting brickwork may not even be a visual improvement.

It changes drastically the original appearance of a building. It can spoil the uniformity of a street and above all, it destroys the natural richness of colour and texture which most of the traditional building materials display. (Note the remarkable variety of natural colours on the brick facade of the small Victorian house in the photograph above.)



PART III SUPPLEMENTARY INFORMATION

14. Grants For Facade Cleaning

Grants may be available in individual cases from English Heritage for external cleaning, especially of listed buildings in Westminster, subject to technical and other considerations, including the necessity/desirability in an individual case. In the first instance, please contact the Development Planning Services Area Teams whose telephone numbers can be found by clicking on the Contacts link below.

15. Further Advice and Bibliography

These guidelines are based on and supplement the Council's policies for Conservation Areas and for listed buildings, as set out in Chapter 9 of the City of Westminster Unitary Development Plan.

Advice on English Heritage grants, cleaning, painting, repair and restoration and other aspects concerning historic buildings can be obtained from Conservation officers in Development Planning Services. The City Council has also produced a number of other advisory publications, many of which may relate to the subject of this Guide and can be obtained from Development Planning Services and One Stop Services. Click on the Contacts List link below for details.

The following publications are recommended as sources of further specialist information on this subject:

Nicola Ashurst: 'Cleaning Historic Buildings' Donhead Publishing, 1994.

John and Nicola Ashurst: 'Practical Building Conservation' English Heritage Technical Publications/Gower, Aldershot, 1988.

John Ashurst: 'Cleaning Stone and Brick' Society for the Protection of Ancient Buildings, Technical Pamphlet 4, 1977 (Rep. 1985).

Adela Wright: 'Removing Paint from Old Buildings' Society for the Protection of Ancient Buildings, Information Sheet 5, SPAB News, Summer 1986.

HMSO: 'Control of Substances Hazardous to Health Regulations' 1988.

CIRIA (Construction Industries Research and Information Association): 'A Guide to the Safe Use of Chemicals in Construction', London 1981.

BSI: 'Cleaning and Surface Repair of Buildings' BS6270 1980 (Revision due in 1995).
City of Westminster: 'The Listing of Historic Buildings' Department of Planning and Environment, Development Division, 1991.

16. Contacts

For information on Planning Permission and on Listed Building or Conservation Area Consent, please contact Development Planning Services:

CLICK HERE FOR LINK TO
WESTMINSTER CITY COUNCIL
CONTACTS LIST

For additional specialist advice on legislation and on architectural, historic and technical aspects:

English Heritage
London Division
23 Savile Row
London W1X 2HE

Tel: **(020) 7973 3000**

Department of Planning and City Development, Development Planning Services, February 1995