

# REMOVING PAINT FROM OLD BUILDINGS

*Adela Wright*

Before stripping any historic surface ask yourself if it is really necessary. Stripping may well remove interesting earlier surfaces, and the wrong method can damage the fabric underneath. In some cases it may be unjustified on historical or aesthetic grounds, particularly if the intention is to leave items stripped that were always meant to be covered.

## *Introduction*

In many old houses and cottages there may be paintings on plaster, stone and timber (such as panels, doors and beams) that are hidden beneath layers of subsequent paintwork. They may represent scenes, patterns or texts with dates that range from the mediaeval period up to 19th century stencil-work. There could also be paint types of antiquarian interest or valuable colour schemes that have remained undisturbed for centuries which contribute to the archaeological interest of the building. Where there is a likelihood that such paintwork exists records should be kept and both investigation and treatment should be done by a specialist conservator. Modern paint removers can destroy layers of history.

Where old paintwork on the interior of an historic building is sound it is best left undisturbed. The adhesion between coats of paint and between paint and substrate is thought to decrease once paint strippers (all methods) have been applied prior to repainting. If repainting involves the use of modern lead-free, or low-lead paints, it is not necessary to remove the old leaded paintwork where it is adhering well. Also, a change of colour does not usually need removal of a coating. Slightly wrinkled or blistered paint will often require no more than a rub-down; mildly chalking surfaces can be washed and rubbed down with fine, wetted abrasive paper. Pure beeswax polish applied to old paintwork on an interior surface that is not to be repainted may help to revive some of its former appearance.

Leaded paintwork can become a serious health hazard when disturbed. Some paintwork in older properties may have a lead content of up to 40%. Dry sanding, especially with a power sander, can spread contaminated dust. Flame removal methods can cause dangerous fumes. Avoid burning debris.

Softwoods in Georgian and Victorian buildings were intended to be painted.

Internal doors and areas of panelling have sometimes been spoilt as a result of the present vogue for burning off paint back to the natural finish: subsequent applications of polish or irreversible varnishes have been absorbed by the grain of the wood which will be difficult to remove if ever the surface is to be restored to its original paint finish. Prolonged soaking of items such as doors in caustic baths, particularly where the treatment is rough and ready, can cause lasting damage.

Paint removal may be necessary where multiple layers of paint have been built up over a number of years and obscured architectural detail. Similarly where many coats have been applied to an opening window this can interfere with its proper operation; it can prevent accurate adjustment of beads and can greatly thicken up glazing bars. The coating of exterior paintwork will often appear sound but may not be adhering to the base and may require stripping back.

A hard paint coating applied over a softer one can result in poor adhesion and cracking of the upper layer. Soft paint over hard does not normally affect the performance of the new work but the more impervious lower coat will continue to inhibit evaporation of moisture within the substrate. (See SPAB Information Sheet No 4 "The Need for Old Buildings to 'Breathe'.")

Damp problems are frequently introduced into an old building by applying a modern cement-based render, or other impervious type paint, to a wall that had previously been limewashed. Removal of the modern paint can damage the wall to a certain extent and it may be preferable to allow the paint to erode naturally and patch with limewash in the meantime.

See BS6150: 1982 Painting of Buildings Section 51.2 on Compatibility of Coatings.

## *Methods of removal*

All forms of paint removal are laborious and slow; technique is more important than method. Different paints respond to different methods and it is therefore helpful to be able to identify the type of paint (i.e. water-thinned, oil-bound, cement, bitumen or polyurethane based, etc.) that has been applied before deciding upon its means of removal. It may be necessary to try several techniques or a combination of methods to achieve success. A "response test" should be made over a small trial area in the first instance to see if the paint can be lifted and to ensure that the substrate will not be damaged.

Manufacturers' instructions as to methods of application and the possible dangers to operators are important.

If the wrong removal technique is used it can make the eventual removal of the paint more difficult.

Where the problem appears complex or where the building concerned is of considerable historic value specialist advice or services should be sought, and SPAB can advise.

### *1. Water washing*

Water washing can be helpful in removing paints but caution is needed to prevent water being absorbed into the substrate. Soda, soft soap and other highly alkaline soaps will leave harmful residues and attack new paintwork. Mild liquid detergents are more suitable. Limewash, whitening and soft (size-bound) distemper can usually be removed with warm water. With other water thinned coatings adhesion is likely to be loosened when thoroughly wetted. Copolymer emulsion paints can be softened with hot water then sponged, scrubbed or scraped off. Where moisture is able to penetrate behind a paint film that has been lightly scored or is flaking adhesion will be weakened. However, if

only a small section is to be removed from an otherwise sound area there is a risk that moisture may become trapped and spread behind the good paintwork and cause blistering.

## 2. Steam stripping

An appliance designed mainly for stripping wallpaper can be useful in removing paint; it generates steam at low pressure and the steam is applied to the paint film via a hose capped with a perforated metal concentrator. The combination of heat and moisture assists removal.

Water-thinned paints, including emulsions and some plastic paints, are softened by steam and then removed with a sponge and water. Steam in conjunction with methylated spirits can be effective in removing multiple applications of old emulsion paint, including polyvinyl emulsion that has resisted other forms of treatment.

Steam stripping can be faster and more effective than water washing methods over large areas. But it can also be slow and laborious in removing multiple layers of some types of old encrusted paint and results are sometimes patchy. The surface of plaster may blister if the appliance is held too long in one position; this can be particularly damaging to old friable plaster.

Steam stripping equipment can be hired; see Yellow Pages under "Hire Building Equipment".

## 3. Chemical paint removers

There are two main types of chemical stripper: solvent (non caustic) and alkaline (caustic). Some chemical stripper may be banned under future EEC legislation as being a health and safety risk.

### *Solvent (non caustic) removers*

Solvent removers are usually based on methylene chloride; waxes are included to retard evaporation. They are very effective in removing oil-based paints but can be less effective with other types of paint. Proprietary brands of stripper vary and some makes can be more useful than others in removing a particular type of paint such as emulsion.

The paint remover is applied with a brush; the solvent swells and softens the paint which is then removed with a scraper. Several applications may be necessary where old hard paint has built up in a number of coats and in these circumstances the stripping can be very slow; preliminary scraping can sometimes be helpful.

Proprietary brands that are available are either water-rinsable or spirit-rinsable. Where a surface is to be repainted waxy residues must be removed according to manufacturer's instructions. Water-rinsable removers

contain an agent that enables the wax to be removed by a thorough wash down with water. With other types, wax deposits are removed with a rag soaked in white spirit followed by a gentle rub down with a pumice stone or fine steel wool depending upon the type of surface.

These paint removers contain toxic ingredients and should be used in well ventilated rooms; some are flammable.

### *Alkaline (caustic) removers*

Alkaline removers are based on caustic soda, potash, washing soda or similar material. They are effective but they can create severe problems and should only be used where paints cannot be removed by other means. They are easily absorbed by porous surfaces and the harmful residues are very difficult to remove. Application should be restricted to small areas. They are NOT suitable for gesso, plywood, veneers or hardboard. They can be harmful to brickwork, stonework, metal, most types of plaster or putty. They may raise the grain of timber and they may also darken or bleach some woods.

These removers are effective on oil-based paints; they break down the oil or resins that bind the paint. The softened paint is then removed by scraping or scrubbing with a hard brush and water. This is followed by a thorough wash down with several applications of clear water to remove all traces of alkali which may attack subsequent coats of paint. The surface is tested for any deposits that may remain by placing pink litmus paper against the damp surface; if the paper turns blue the surface should be washed again with water containing a neutraliser such as acetic acid.

Caustic removers are available in liquid, paste or "blanket" form. The stripping blanket prevents the paste from drying out and the paint sticks to the blanket which facilitates removal; this can be useful where paint is embedded in crevices. Dipping wood in a caustic tank will destroy natural oils in the timber; it can cause cracking, shrinkage and opening up of the joints. Proper neutralisation of the acid is important.

### *Poulticing*

This may be necessary for stubborn areas of paintwork where paint is embedded in pits and grooves such as brickwork, stone ashlar and timber beams. The poultice may be made up by using powdered clay, such as attapulgite or sepiolite (for brick and stone) also whitening or sawdust mixed with a suitable non-caustic proprietary stripper. The mix once applied is prevented from drying out by covering with polyethylene sheeting (Cling Film). The Paste is removed with a knife and the surface is

washed down thoroughly with clear water; a sponge or bristle scrubbing brush may be necessary to remove any paint residues. Proprietary caustic-based poultices are also available.

## 4. Abrasive methods

### *Hand scraping and sanding*

Paint was often applied to original ground without sanding the surface; if the paint or varnish has become brittle it should flake off when scraped. Hand sanding using wetted medium-coarse glass paper wrapped round a wood block is suitable for removing a thin film of paint from timber. The careful use of carborundum blocks and water is another method; it is laborious but often effective.

### *Mechanical methods*

Hand powered tools used with sanding attachments, such as disc and drum sanders, flap wheels or rotary strippers, are generally only suitable for flat surfaces or for fences or claddings which are to be stained rather than repainted. Working along the grain is important; scratches and ripples on the surface are a common problem.

Mechanical methods should only be used as a last resort and only if removal of paint can be done without risk of damage to the substrate as the surface can easily be removed in the process. The system is sometimes used to remove multiple layers of old paintwork or certain two-part paints that do not respond to other forms of paint removal. Blast cleaning should be in the hands of an experienced contractor and careful supervision is necessary; most damage is caused by the technique used rather than the system. The selection of grits for air or water abrasive methods, and air and water pressures to suit the job is important.

High-pressure water cleaning methods when used to remove paint can be aggressive. Saturation of walls can occur if the water is not carefully controlled; pressure is critical.

## 5. Hot air paint stripper

This system is basically the same as the burning off method but fire risks are less because the temperature is lower.

Hot air is produced by an electric filament and the heat can be adjusted to any of five settings with temperatures ranging from 20°C-600°C.

The tool is designed to soften and blister oil-based paints and varnishes. The paint is then scraped away with a stripping knife or scraper; for awkward crevices and delicate work a shave-hook is used.

Hot air strippers are not suitable for the removal of water-based paints, some



primers and undercoats or for removing paint from metal or plaster. Special nozzles should be used on window frames and the glass should be protected against cracking by heat. It is best to avoid this method on frames containing old glass as this is now irreplaceable.

The method is fast and effective on wood surfaces but it is easy to damage mouldings with the scraper if hurried. The paint is only softened sufficiently to lift it gently from the surface. The absence of flame decreases the risk of fire damage but the surface of wood can become slightly scorched if the tool is directed too long in one place. Also sparks have been known to ignite flammable materials such as thatch or dust in sash boxes.

#### 6. Burning off methods

Blowlamps or blowtorches are used to soften paint prior to scraping with a knife, scraper or shave-hook. The method is quicker than other forms of removal but **IT POSES SERIOUS RISKS TO AN OLD BUILDING WHERE FIRE HAZARDS ARE GREATER.** There is a danger not only that the paint itself may catch fire but that rotted timber below the paint film may ignite without being immediately noticeable; timber may smoulder unseen for several hours. Stripping a sash window can be particularly dangerous where dust in the sash box may become ignited and not be visible. Also it is easy to scorch wood and crack glass.

The method is effective on oil-based paints but not water-based coatings. It should never be used to remove flammable coatings (e.g. some cellulose enamels). With some emulsion paints minute explosions can be caused resulting in showers of hot particles. Paint is difficult to remove from crevices.

The risks involved in using this method on old buildings are so great that some contracts ban blowlamps and blowtorches on site.

### Specific problems

#### 1. Brick and stone

All methods of removing paint from brick or stone will damage the base material to some extent. Although removing the paint would benefit the wall the ideal course would be to allow the paintwork to weather and disintegrate naturally; during the intervening period a coat of limewash of a similar colour will improve the appearance of the wall. In an old wall damp can become trapped behind a paint film and weaken its adhesion; alkali from lime mortar and soluble salts may also attack oil-based paints. Breakdown of paintwork on damp or eroded brick or stone is likely to be



*Multiple layers of oil-bound paintwork has prevented evaporation of moisture within the wall. Limewash would have allowed the wall to "breathe".*

within five years for most modern paint types.

Solvent (non caustic) strippers can be successful in removing some paints. A poultice using attapulgite or sepiolite clay together with solvent may be necessary where paint is embedded in grooves. Old paint can be very difficult to remove from very porous brick or stone. Alkaline (caustic) strippers and air abrasive methods should be avoided.



*A modern paint coating, consisting of fine aggregate bound with resin, spalling less than two years after application to an 18th century wall.*

#### 2. Plaster

To remove paint from plaster keep water to the minimum, prolonged soaking will soften plaster. Solvent strippers, or steam strippers in conjunction with methylated spirits, can be successful. It is an advantage when repainting old plaster, particularly decorative work, to use limewash, whitening or soft distemper (size-bound, non washable); these can be washed off between applications which will prevent a build up of paint and loss of detail. Alkaline removers should be avoided as the harmful residues can be readily absorbed by plaster. Gesso can be destroyed by alkaline strippers.

#### 3. To remove paint from oak beams

To remove whitewash: brush down and wash with clear water; steel wool will help to remove limewash embedded in grooves. For oil paints, emulsions and tar, solvent strippers in conjunction with poultices can be successful. The appearance of oak may be improved if the treatment is followed by an application of three coats of thin limewash; this is left for a few days to dry then brushed down hard with a bristle brush.

Mechanical methods, such as grit blasting, will spoil the surface of the wood and should never be used on an old building.

#### 4. Metalwork

**Non-ferrous metals.** Solvent (non caustic) strippers are used. Solvents based on methylene chloride are more effective if applied in poultice form. The surface is coated with a 3 mm thick poultice and covered with Cling Film or a similar sheeting to delay drying out and left for about two hours. All traces of residues are removed with white spirit.

**Ferrous metals.** Solvent or alkaline type strippers or mechanical systems are used.

An alkaline (caustic) stripper in poultice form can be successful; it slows down corrosion and does not roughen the surface. Neutralising with acetic acid is necessary after application. If the caustic solution becomes embedded in crevices and joints it may be difficult to neutralise and corrosion is likely in these areas if moisture penetrates.

Mechanical methods include the use of a chipping hammer or mechanised needle hammering; both methods are slow. Air and water borne abrasives are useful on cast iron. A fine grade of crushed copper slag is normally used as the grit. The surface of the metal should be primed immediately after blasting to prevent rust formation. Grit blasting will destroy a smooth surface on wrought iron.

Paint and mill-scale can also be removed by using the oxy-acetylene flame-cleaning system.

If multiple layers of paint have obscured intricate designs on a cast iron fireplace, or a rainwater hopper, a caustic bath will remove the paint and prevent subsequent rusting.

#### 5. Graffiti

There is no general solution to the removal of graffiti but it is important to begin treatment as soon as possible so that the paint does not have time to harden. Long standing aerosol paints are almost impossible to remove from porous surfaces such as old brickwork and

stonework; there is also a risk of spreading the paint and increasing absorption in the process. Cleaning with an air abrasive pencil using a suitable fine abrasive, followed by toning down the cleaned patch by rubbing with stone or brick dust, may be successful.

A solvent based (non caustic) poultice should be tried; if this fails an alkaline (caustic) remover in poultice form might

be effective. The brick and stone must be thoroughly washed afterwards. A second poultice, (without the chemical incorporated) can be applied to help draw out the residual salts.

Anti-graffiti coats are available to protect walls but they can create problems by trapping moisture and salts behind an impermeable membrane.

*Graffiti is extremely difficult to remove from a porous surface. An old building may be permanently disfigured.*



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## PAINT TYPES and some methods of removal

Consult manufacturers of paint if known.

### Bituminous paints

There is no entirely satisfactory method. Steam cleaning may be helpful. Some types will respond to naphtha. Mechanical methods may be necessary. Bituminous stains can be removed by scraping followed by scrubbing using water containing liquid detergent; when dry a poultice with white spirit is applied.

### Cement paint

Difficult to remove. Some will respond to dilute hydrochloric acid; thorough washing is needed after application as the acid can cause damage to the substrate, particularly limestone. Low pressure wet abrasive methods will probably be necessary.

### Chlorinated rubber-based paints

Try naphtha (unpleasant to use but useful). Consult manufacturer if known.

### Creosote

Difficult to remove. Solvent strippers can be effective if penetration of the coating is shallow. It is usually best to allow creosote to weather and fade naturally. "Bleeding" can occur if painted over with other paints.

### Distemper, oil-bound (washable distemper) water paint e.g. Walpamur

Can be difficult to remove. Steam stripping followed by stripping with a knife is usually the most successful method. Hot water washing and scrubbing can loosen adhesion of some types of paint.

### Distemper, size-bound (soft distemper). Also ceiling distemper or whitewash.

These distempers are generally removed by washing down thoroughly with warm water. Do not add alkaline soaps or detergents as harmful residues can be absorbed by porous surfaces. Steam stripping is also successful.

**Emulsion paints** (based on pva and acrylic copolymers) mainly for internal use

Removal depends upon the type of emulsion and the number of coats. Some can be softened with hot water and scrubbed and scraped off. Some respond to a solvent stripper. Steam stripping is effective on one or two coats.

Steam stripping in conjunction with methylated spirits may be necessary for removing multiple layers of old paint, including polyvinyl emulsion that has resisted other forms of treatment. A solvent stripper combined with a poultice is sometimes successful. Preliminary hand rubbing will reduce encrustation.

### Limewash

Brush down all loose material with a bristle brush. Washing and scrubbing is usually sufficient. Old sulphated limewash in multiple applications may need to be softened with a wet poultice over a long period or, (as a last resort), removed mechanically.

### Oil paints (alkyd) flat, gloss and enamel paints

Solvent removers, hot air strippers and abrasive methods.

### Masonry paints

Compositions vary. Consult manufacturer if known on means of removal. Some types respond to chemical strippers. Chemical strippers in paste form can be successful.

### Tar

On a non absorbent surface tar can sometimes be removed by washing and scrubbing with water and detergent. A solvent stripper used alone or combined with a poultice should aid removal. Mechanical methods may be necessary. A blow torch can be successful on cob (but see warning note above especially near thatch).

### Textured coatings

Will respond to chemical strippers but large quantities would be needed in thick films and harmful residues are likely to be left in porous materials. Some resin bonded coats can only be removed by mechanical methods.

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## References

- Cleaning Stone and Brick by John Ashurst. SPAB 1977; revised 1986.  
BRE Digest 197. Painting Walls. Part 1. Choice of Paints. 1982.  
Repair of Ancient Buildings by A. R. Powys. SPAB reprint 1981.  
Painting and Decorating by Hurst and Goodier.  
BSI 6150: 1982. Painting of Buildings.  
BS 3761: 1970. Water Resistant Paint Removers.

## Appendix. Suppliers of materials

- Attapulgit clay.** Lawrence Industries. Mitcham Industrial Estate, Streatham Road, Mitcham, Surrey CR4 2A7. Tel. 01-648 2272.  
**Sepiolite clay.** Frank Joele Ltd, Old Meadow Road, Hardwick Industrial Estate, Kings Langley, Herts. Tel. 0553 60851.  
**Whiting.** Cornelissens, 22 Great Queen Street, Covent Garden, London WC2B 5BH. Tel. 01-405 3304.

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