

Horgan & Webb

Restoration & Conservation

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LIMEWASH

Essentially, limewash is a mixture of slaked lime (calcium hydroxide) in water, which sets slowly by absorbing carbon dioxide from the air. The chemical reaction that occurs produces crystals of calcite (calcium carbonate). These crystals are unusual in that they have a dual refractive index; light entering each crystal is reflected back in duplicate. This results in the wonderful surface glow that is characteristic of limewashed surfaces, and is not found in other decorative finishes.

However, when limewash was discovered, man was not looking for a decorative finish to impress his neighbours. He had actually discovered a sacrificial treatment, which protected his dwelling against the worst weather. Early mud structures and wattle and daub panels were very vulnerable to the climate and limewash still plays a most important part in protecting these surfaces in particular.

Prior to the patenting of Portland cement in 1824, most structures were constructed of solid, porous materials which keep out damp and rain through their thickness and their high porosity or vapour permeability; that is to say that they dry out so quickly that damp never penetrates the thickness of the wall.

Rapid drying was aided by the use of open fires, and the kitchen fire in particular, which remained alight throughout the year, providing both heating and ventilation. Some idea of the rate of ventilation this provides can be gained by watching the rate at which smoke pours out of a chimney, as air is drawn into the building at exactly the same rate. This marvellous ventilation ensured that any moisture present in the building was expelled through the chimney in a very short time.

Limewash assists in maintaining the ability of the building to breathe as it is one of the most vapour permeable decorative coatings. Tests show that limewash has a vapour permeability rating of about 350 units while many of the masonry paints are well below a rating of 75 units.

If a building is prevented from breathing, water can become trapped in the external walls, resulting in the decay of the masonry and producing ideal conditions for timber rot to commence. Condensation may take place and heating bills rise as a damp wall transmits heat faster than a dry wall.

THE MATERIALS USED

Prior to the introduction of Portland cement, lime putty was the principal binder in mortars, renders and plasters. It was therefore logical that the same material should be used as a finish on lime plasters and renders. Its use internally on plaster is mainly decorative but on external renders its protective qualities are essential.

Lime putty is made by burning limestone or chalk (both forms of calcium carbonate) to produce quick lime (calcium oxide), which is then “slaked” by adding water.

Traditionally, limewash was produced mainly from lime derived from the purer sources of limestone, as limestones contaminated with clay may produce an ‘hydraulic’ lime when fired which sets by reaction with water.

Tallow was often added to limewash to make it water droplet resistant while retaining most of its quality of vapour permeability.

More recently, raw linseed oil was added for the same purpose. Other alternatives used nowadays include casein, which increases the vapour permeability, resists dusting and, being a weak form of adhesive, may be useful when decorating difficult surfaces.

Although, historically, sea water was used during the slaking process in the eastern counties, and common salt may be added to limewash to reduce dusting, the practice is seldom used today due to the importance of keeping salts out of the fabric of the buildings.

For colourwashes (coloured limewashes) care should be taken in selecting water-soluble pigments to ensure that they are not affected by ultra violet light, nor by lime.

A variety of earth pigments are available and these should be soaked for at least 24 hours before being incorporated into a wash. These are essentially refined earth or clay with a strong natural colour, such as red and yellow ochres. The colour is given by their mineral content and they are therefore least likely to fade in the sunlight or by chemical reaction with the lime.

MAKING A LIMEWASH

Limewash is not difficult to produce providing that a few simple but important rules are observed. Having slaked the quicklime, the resulting putty should be left for at least three months to ensure that all the quicklime has reacted with the water and that the particles of lime have started to mature.

The putty should be sieved to exclude any foreign material, as even the finest and purest naturally occurring limestone will contain some contaminants.

Limewash should be applied as thinly as possible to facilitate carbonation and prevent crazing that can occur when applied more liberally and it is therefore recommended that the putty is diluted with sufficient lime water (that is, water that has been saturated in lime putty) to produce a wash the consistency of milk.

Providing that it is thin, there is little likelihood of an overenthusiastic operative applying too thick a coat.

To this basic limewash may be added binders such as raw linseed oil which will help it to adhere by making it moisture droplet resistant while remaining vapour permeable.

In the event that tallow is to be added, this can only be effectively included during the slaking process. While there has been a long tradition of tallow in limewashes, its use on interior walls is not to be recommended, as it is liable to become rancid in warm weather.

As a water-based product, limewash is most suitable for application onto an absorbent background. Traditionally it was applied to earth walls, brick, limestone, and calcareous sandstone, lime render, plaster and timber.

For those trying to produce a colourwash for the first time, it will be rather disconcerting to find that, having made what appears to be the appropriate colour in the tub, it dries many shades lighter once it is applied.

Colours need to be dry tested to ensure the correct hue has been achieved. Furthermore it is almost impossible to reproduce exactly the same colour if a further supply is required for the same job.

APPLICATION

When making or applying limewash, safety goggles and gloves should always be worn. Lime is irritating to the skin and, in contact with the eyes, may cause pain and impairment of vision if not treated immediately.

As with so many jobs, good preparation is important. The background should be absorbent; inappropriate old paint treatments should be removed; and, if a paint stripper is used, a check should be made to ensure that the pH of the surface has not been radically changed. Insufficient washing down after the use of an acid-based solvent, for example, may leave the surface sufficiently acidic to interfere with the limewash, resulting in failure.

When rejuvenating an old limewashed surface, care must be taken to remove any loose or spalled material and the entire surface should be thoroughly washed down using a soft scrubbing brush to ensure that the dust is removed.

All surfaces to be limewashed should be wetted with clean cold water and left until the surface is damp but not wet.

The best results are obtained when the limewash is almost scrubbed into the surface with a brush that is stiffer than a conventional paint brush, but softer than a scrubbing brush, such as a soft bristle dustpan brush (which costs only a couple of pounds).

The application should be with a circular motion, ensuring that the limewash is worked into the surface and spread as far as possible. The work should be finished with vertical strokes.

Limewash cures by absorbing carbon dioxide from the atmosphere and this process is prolonged during periods of low temperature or high relative humidity.

Even though the application has been kept as thin as possible, it may take several days before it can be safely overcoated. It is advisable to leave it for at least five days before further work is carried out.

Care should be taken to choose a period of fine weather before applying limewash externally as a fresh coat is vulnerable to dilution by rain, which will manifest itself as white streaks running down the work, or the colour washing out.

Should this occur all is not lost as, once this coat has cured, a further coat will cover the damage.

Further dismay may be experienced by the newcomer to limewash when the first coat is applied and appears very thin and almost without any body or depth. Reassurance is close at hand when after only a few hours, the cure starts and the depth and vibrancy of this material begins to show.