

# ROUGH-CAST FOR HISTORIC BUILDINGS

by Andrew Townsend

## Introduction

Decay and the continuing fashion for "scraping" coatings and coverings from old buildings means that ancient rough-cast render is becoming increasingly rare. This is regrettable as gently eroding old rough-cast with a fading limewash coating adds much to the visual qualities of a building whilst providing excellent protection against the weather. This information sheet is intended to give assistance in the repair of old rough-cast as well as suggesting its use for the remedy of some defects found in old buildings.

Traditional lime-based rough-cast is not found on ancient buildings in all parts of the British Isles, although pre-mid 19th Century examples still survive in most parts of Scotland, Wales and Northern Ireland as well as in more than half the counties of England.

As with most vernacular building techniques, nomenclature varies from region to region. The name "rough-cast" is used in most parts of southern England although the same material is known as "wet-dash" in the Lake District and "harling" in Scotland.

## Why Rough-cast?

In order that an old building may continue to deal with moisture absorption successfully, any covering which is applied to the walls of the building (either anew or as a repair to existing material) must allow moisture to continue to evaporate. This can only be achieved by forming the covering from materials which are not denser or more permeable than the walling they cover. Any substantial decrease in permeability will inhibit the free passage of moisture and decay is likely to occur at the interface of wall and covering. For this reason, the use of cement-rich wall coverings on old buildings should generally be avoided.

The advantages that lime-based rough-cast has over smooth render of similar permeability are two-fold:

1. *Resistance to Shrinkage*—The shrinkage which often occurs in wall coverings applied by pressing on with a trowel or float (i.e. smooth render) means that much time must be spent repeatedly wetting and "scouring" the surface. Although rough-cast may be more time-consuming to apply, the method of application ensures that a mix com-



General distribution of traditional rough-cast in the U.K.



Frost action on moisture trapped behind cement-rich rough-cast has led to the disintegration of rubblework and dressed quoins with the rough-cast peeling off in large sheets.

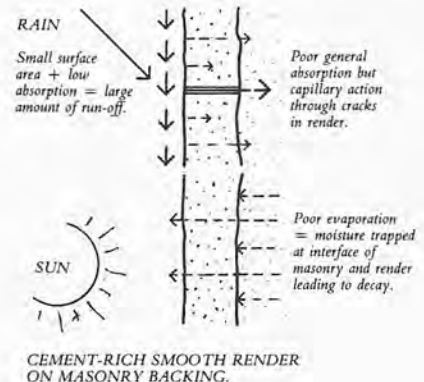
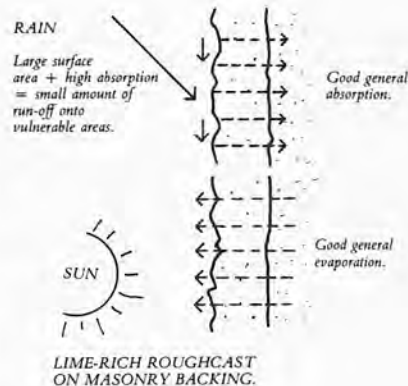
prising coarse and well-graded (and, therefore, shrink-resistant) aggregates is possible. Such a coarse mix could not be applied as a floated render.

2. *Good Weathering Properties*—The open texture of rough-cast allows it to act in a beneficial way during and after wet weather. In absorbing rain as it falls and runs down the surface, the rough-cast plays an important role in helping to protect the more vulnerable parts of the building such as window openings and foundations. After rain, the wall dries out quickly because of the relatively large surface area of rough-cast compared to the flat surface of smooth render.

## Repairing Existing Rough-cast

### 1. Investigation

Where existing rough-cast is found to have fallen from the wall, repairs to the remaining materials may be considered. Like all problems of building decay, the first step must be to try to discover the cause of decay then, if possible, to treat the defect in order to remove or reduce the effect on the building. With rough-cast, localised decay often occurs as the result of defective weatherings (copings, tablings, string courses) and these should



be repaired to help protect the face of the wall.

Where rough-cast is peeling at the foot of a wall, this may be the result of rising damp leading to salt attack or, possibly, frost action. Unless rapid decay occurs, no treatment is necessary as the rough-cast is acting in a sacrificial manner, decaying instead of the masonry. As these areas are usually easily accessible, rough-casting should be considered as part of the regular maintenance. (However, other defects, such as leaking rain-water goods, may be the cause of such decay and should be remedied where possible.) Injection of a chemical damp-proof course or covering the base of the wall with a hard, cementitious render or rough-cast should be avoided as these could lead to further problems.<sup>2</sup>

Where a stone or render plinth exists this should be repaired if necessary and roughcast finished against it. On walls with no plinth, roughcast should not be finished short of the ground as is often the modern practice. As well as sometimes being visually disturbing (making the main bulk of the wall appear to float above the ground) decay of the unprotected masonry may occur just above the ground.

In some cases, the wall covering will be found to have simply worn away, especially in exposed positions, through the action of weather on the face of the wall. One or more coats may have eroded, exposing coats beneath or the face of the masonry itself. Investigation of sheltered spots may give clues to the original composition of the wall covering.

During investigation, some areas of existing rough-cast may be found to have lost their key to the masonry backing. With a modern, cement-based render, the standard practice for dealing with such a "defect" is to remove and re-render all unkeyed areas, but old, lime-based rough-cast which sounds hollow will often continue to provide satisfactory surface protection for a long period and should not be removed except in extreme cases (e.g. where large costs would be involved in providing several lifts of scaffolding to reach a remote area). Simple methods of consolidating loose, unkeyed render are discussed under *Application*. Where the wall covering is thought to be particularly ancient and is in a delicate condition, specialist conservators can be consulted to carry out consolidation and grouting to fill voids between unkeyed rough-cast and its masonry backing.<sup>3</sup>

Before attempting to repair rough-cast, its qualities should be carefully analysed. Some notion of the permeability softness and flexibility of the material can be gained by examining its ingredients. These may include lime, earth, sand, stone dust, brick dust, pebbles, gravel, grit, dung, ash, hair and crushed glass.<sup>4</sup> Crushing and rubbing a small sample of

existing material in the hand gives an idea of its softness and weakness. For a more detailed analysis of harder material, the sample may be dissolved in a solution of 10% hydrogen chloride (acid) followed by washing and grading of aggregates. Goggles (or safety glasses) and gloves should be worn when handling acid.

Most old rough-cast will have been lime-washed at some time during its life to give extra protection and if this is not immediately obvious then signs are often found in sheltered spots under drip moulds, cornices, etc. Limewash will always help visually to unify existing and new areas of rough-cast as well as giving extra protection. It is sensible to decide as early as possible if limewash is to be re-applied; if a wall is to be left without a limewash covering, then materials might be chosen for the repair to give a similar finished colour to the original rough-cast.

Where repairs are to be carried out to rough-cast near corners, openings, mouldings and so on, the fashion in which the covering meets these points needs to be considered. For instance, much early rough-cast dies out onto the dressed quoins of masonry buildings whereas later examples can be seen to wrap around the corners of walls to cover weaker construction.<sup>6</sup>

Finally, thought should be given to the qualities of the masonry that is to be covered, in order to determine whether the new material will gain an adequate key without hacking mortar from the joints, especially if the mortar is thought to be ancient. Observation of the original laying-on coats of nearby sound rough-cast may determine how far back into the joint this has been pressed and, therefore, how much of the filling of the joint should be removed to gain an adequate key for the new work.

## 2. Preparation

Rough rubble masonry will usually



A good rough-cast surface dying out onto the quoins of a rubble-built wall from a cottage at Castle Combe.

give an adequate key without the need to remove material from the joints. Smooth masonry at quoins, window surrounds, etc., has often been hacked already or has become sufficiently pitted from weathering to form an adequate key. In all cases, hacking the face of masonry to form a new key must be avoided.

All loose material should be gently removed from the area that is to be repaired with a soft brush and any lichen or moss growth treated with biocide.<sup>7</sup> Sensitive areas, such as the junction of the masonry face with existing rough-cast near areas to be repaired, should be masked with polythene sheet during dampening down otherwise delicate rough-cast may be forced off the wall by the rush of water. The method of dampening the masonry depends on the fragility of surrounding materials but it can usually be successfully carried out with a garden spray or by flicking water onto the wall with a brush. Whatever the method, the object is to thoroughly dampen the masonry to limit the rate which moisture is sucked out of the new first coat by its backing. This is particularly important during warm, dry weather. Once the wall has been dampened down, it should be left for a short time to allow all excess moisture on the face of the masonry to dry out, with subsequent dampening if necessary.

In readiness for rough-casting, areas of masonry to remain exposed, such as quoins, label moulds and string courses, should be masked to avoid the inevitable splashes from thrown render.

## 3. Mixes

In following SPAB principles, the aim should always be for the rate of decay of a conservative repair to be the same or greater than that of the existing materials. To achieve this sacrificial quality, the mix of the new work must be com-

patible or weaker than the mix of existing materials. Also, in order to enhance the passage of moisture from the masonry to the open air, each coat of render or rough-cast applied should be of a weaker mix than the preceding one.<sup>8</sup>

Although the choice of suitable mixes will depend on an analysis of existing material, suitably weak mixes for use alongside most ancient rough-cast can be made with the following ingredients:

#### Laying-on Coats

1 part lime putty  
4 parts sharp sand

#### Cast Coats

2 parts lime putty  
4 parts sharp sand  
5 parts shingle or pea gravel

Hair can be added to laying-on coats if excessive shrinkage is a problem,<sup>9</sup> although any minor cracks which open up in the laying-on coats will be filled by the subsequent thrown coat. Larger cracks are more alarming and suggest that the key with the backing may have been lost during drying-out. This can be caused by one or more of the following:

- too dry a backing
- warm, dry weather conditions
- coat laid on too thickly or unevenly
- too many fine or evenly sized particles present in the mix
- uneven wetting of backing or uneven drying of the render.

Ideally, lime putty is made by slaking quicklime or else obtained (in putty form also) from suppliers listed in Information Sheet No. 9—An Introduction to Building Limes by Michael Wingate (SPAB 1988). Unless hydraulic lime is to be used, all the ingredients should be mixed up *well* before use—the longer the better—and beaten just before use to improve the lime-aggregate contact and to remove surplus water.<sup>10</sup> If pozzolanic additives (brickdust, ash, PFA) are to be used to achieve a quicker, harder set, these should be added just before use.

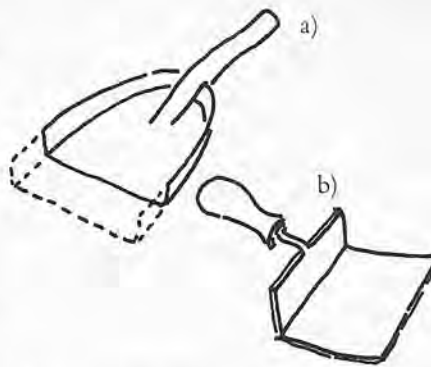
The amount of water added to the mix must be carefully controlled. Laying-on coats should be kept as dry as possible to avoid shrinkage whilst still being workable and adhesive. The wetness of the mix for casting, on the other hand, depends very much on the final texture required; a dry mix will be hard work to apply and will tend to give a lumpy, coarse textured finish whereas a wetter mix will spread in a more even fashion. However, if the mix for casting is too wet, it will splash off the wall when thrown.

#### 4. Application

In general, follow the pattern of existing coats when deciding how to apply new work. It is better to build up in several thin coats rather than trying to



Rough-cast being applied with a wristy backhand flicking motion.



Tools for throwing rough-cast mix:  
(a) sawn-off coal shovel  
(b) casting or "dashing" trowel.

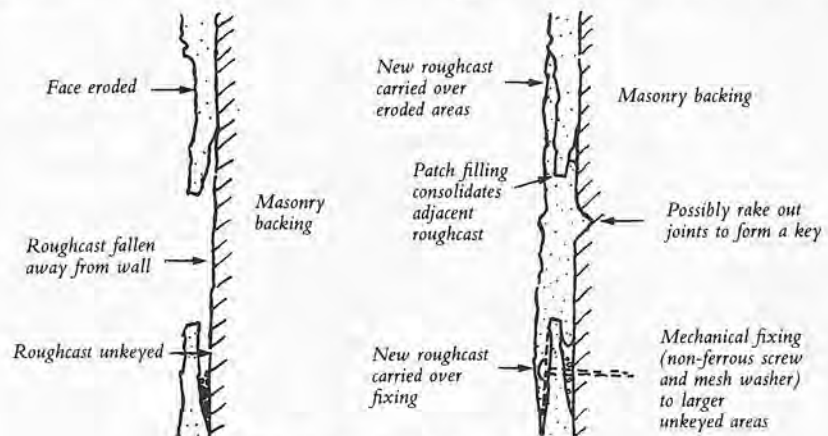
fill a patch in one or two thick coats. Applying thin coats will allow the contours of the wall to be followed easily and should help to avoid the cracking which often occurs in thicker, uneven coats. Some coverings on ancient buildings were applied as a series of cast coats, perhaps only with a dubbing coat pressed on with a trowel, and this precedent may be followed in repairing such material.

Laying-on coats should be applied in the conventional fashion with a plasterer's float. If cracks begin to appear these can be remedied by repeated scouring (wetting and rubbing over with a wooden float in a tight, circular motion) whilst the coat is still leathery. A key for the subsequent coat should be formed in each laying-on coat with a devil float or similar spiked tool. Diagonal scratching in two directions is thought to give the optimum key.<sup>11</sup>

For maximum adhesion between coats, each coat must be applied onto the next whilst the base is still "green" and the base should be dampened lightly to reduce the suction of moisture from the subsequent coat. As the time taken for each coat to dry to a green, leathery state may take as little as a few hours or as long as 2 days, careful programming of the work may be necessary. Slowing down of the drying process by repeated spraying of the surface or by covering the surface with polythene sheeting may assist in maintaining the work in a green state until it is convenient to apply the next coat. This is particularly important during warm, windy weather, especially on walls in direct sunlight, when drying out can be very rapid leading to cracking and weakening of the newly applied material.

Cast coats can be applied in whatever fashion feels comfortable; one recognised method is i) hold a bucket of casting mix under the left arm, taking about a handful of mix onto the casting float held "backhand" in the right hand; ii) flick the tool with a wristy, backhand stroke towards the spot to be covered (see illustration). This technique will take practice to master; the important point is to develop an even, rhythmic, relaxed action.

Casting or "dashing" floats (see sketch) may still be bought from a few ironmongers or builders merchants, although a small coal shovel of the type illustrated will serve the purpose almost equally well. Rough-cast must never be applied mechanically (i.e. with a "Ty-



REPAIRS TO DECAYED ROUGHCAST

rolean Renderer", or the like) as this method fails to give the variation in force required and tends to leave a bland surface finish to the wall.

Successive coats may be cast one on another until the required thickness is achieved and casting can spread onto surrounding, existing rough-cast to give an even finish or to cover laying-on coats where their top coats have been lost due to erosion.

In a similar way, new rough-cast applied adjacent to loose areas of existing material will help to consolidate these (see illustration). Where small patches are to be repaired and trowelling is likely to damage existing rough-cast, then the whole of the repair may be carried out by building up in several cast coats.

Repeated gentle dampening (using a garden spray) of rigid areas of roughcast separated from the backing usually leads to the material becoming pliable enough to reaffix to the wall using a lime slurry type grout with (if necessary) mechanical screw and washer fixings as illustrated.

Once the final coat has been thrown, the wall can be left to dry although, again, the precaution of covering the work with a polythene sheet should be taken in warm, dry conditions. If the texture of the repair appears to be too coarse, this can be remedied by rubbing the surface of the final coat with a rag whilst still green or by removing the high spots with a wooden block once the final coat has set. Alternatively, a finer, wetter cast coat may be applied to fill up flush between the projecting lumps. Where the wall is to be limewashed, minor differences in texture between new and existing work will be lost as the voids in the more open-textured surface tend to fill up with several coats of lime-wash.

### New Rough-cast on Existing Masonry

#### 1. When to use

The application of new rough-cast to an existing wall might be considered as the solution to several types of problem associated with the wall. It can provide a covering for decaying masonry or an extra layer of protection where moisture is penetrating a wall which is unduly slender or is in an exposed position. In either case, the use of rough-cast will often prove to be the cheapest form of effective repair avoiding any costly refacing or thickening of walls. Very little of the *existing* material need be removed during remedial work if this method of repair is employed. However, an important consideration is that the architectural qualities of many buildings will be altered by the covering of existing wall surfaces with a rough-cast finish. In certain circumstances (e.g. decayed ashlar), a smoother render may be deemed more appropriate as a surface



*Bryn-y-mor House, Cardiganshire: the use of cement-based mortar and paint increased the quantity of driving rain passing, by capillary action, through the exposed slate walls of this house. Following removal of these earlier 'repairs', lime-based rough-cast and limewash have been applied with successful results.*

finish. Note that if the building is listed or in a conservation area appropriate planning approval will be necessary.

#### 2. Preparation, Mixes and Application

The method of preparation and the choice of mix recipes is discussed in the *Repair* section and the same principles apply for new work. However, as the new material is not playing a sacrificial role in a relationship with existing render, then a series of slightly stronger mixes may be considered. For example:

##### Laying-on Coats

1 part lime putty  
3 parts sharp sand

##### Cast Coats

3 parts lime putty  
5 parts sharp sand  
6 parts shingle or pea gravel

The details of existing masonry will usually determine the way new rough-cast should be applied at openings, corners and so on. Where there are raised quoins and window surrounds, it will be a simple enough task to finish the rough-cast abruptly at these points. Flush quoins and window surrounds will present more of a problem and the decision whether rough-cast should cover or die out on them will rely largely on the quality and condition of the dressed stone or brick.

#### References

1. Information Sheet No. 4—The Need for Old Buildings to Breathe by P. Hughes (SPAB 1986).
2. Information Sheet No. 6—An Introduction to the Treatment of Rising Damp in Old Buildings by Gilbert Williams and Nicola Ashurst (SPAB 1987).
3. Information on suitable conservators is available from SPAB or UKIC, 37, Upper Addison Gardens, Holland Park, London, W148AJ.
4. Historic Building Construction by C. F. Innocent (CUP 1916) page 146-147.
5. This analysis may also reveal types of render found in some parts of the country (e.g. Berkshire, Wiltshire, Gloucestershire) which are formed by beating smooth render with a brush of twigs (to re-work the surface in order to reduce shrinkage) thus giving the appearance of rough-cast.
6. Repair of Ancient Buildings by A. I. Powys (SPAB 1981) page 87-88.
7. Ancient Monuments Technical Notes 1: Control of Organic Growth (Revised) by John Ashurst (DOE 1979).
8. Mortars, Plasters and Renders in Conservation by John Ashurst (EASA 1983) page 25.
9. *ibid* page 18.
10. *ibid* page 10.
11. Plastering Plain and Decorative by William Millar (Batsford 1899) page 91.

#### Further Reading

English Heritage Technical Handbook Vol. 3—Mortars, Plasters, Renders by John and Nicola Ashurst (Gower Technical Press 1988).  
Information Sheet No. 1—Basic Limewash by Jane Schofield (SPAB 1985).