

MIKE WYE & Associates Ltd

Traditional & Ecological Building Products
Specialists in Cob & Stone Repair
Conservation Repair Consultants
Practical Skills Training Courses

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6th February 2017

Steve Baber
East Worlington Parish Hall
Crediton
Devon
EX17 4TS

email: baberworldwide@gmail.com

Our ref: q1702EastWorlington

East Worlington Parish Hall

Dear Steve,

Thank you for inviting me over today and showing me around the Parish Hall. I have included my report and quotation with regards to the outside renders and additional works which are valid for 9 months.

As you know, we specialise in the repair of traditional cob and stone buildings. We produce all our own lime mortars, lime plasters and limewash using the finest quality Buxton quicklime and hence have total control over the quality of lime mortars and limewash used for rebuilding, rendering, plastering, pointing and limewashing. We rebuild and repair cob, stone and brick walls with these traditional materials and have a dedicated team tackling a variety of projects from entire rebuilds and barn conversions to specialised polished plaster finishes such as Venetian marble plaster and Moroccan tadelakt. Please visit our website for comprehensive information about our projects and products.

Prior to this century building techniques were very different to those practised today. Traditional buildings benefit in a number of ways from using lime putty based renders and plasters as opposed to hard impervious cement-rich renders and modern gypsum plasters;

- their porosity allows the structure to breathe rather than trap moisture
- their elasticity helps to accommodate general movement, reducing cracking
- their self-healing nature reduces cracking problem
- stone masonry pointed with lime mortar allows moisture to evaporate from the joints, rather than the masonry, reducing frost and salt crystallisation damage
- a limewash finish protects the render whilst allowing moisture to evaporate rather than become trapped behind a modern acrylic or impermeable skin

Technical Report

East Worlington Parish Hall lies within the curtilage of the former rectory adjacent to East Worlington Parish Church of St Mary's. The front elevation faces west onto a nearby lane and the rear faces east into an enclosed yard. The ground slopes gently from north to south and west to east. The Parish Hall once a C17 barn is mainly constructed of random rubble stone and cob rendered with a thatched roof. There are a few recent additions to the parish hall, those being the front foyer and the kitchen on the west gable. It is understood that the concrete tiles over the kitchen are to be replaced with natural slate tiles. The renders on the main building are lime renders which have been lime washed but have now delaminated in areas where moisture has penetrated through hairline cracks within the renders.

If the external renders are removed in order to replace them with breathable lime renders and mineral paints its possible that the underlying cob and stone walls will be shown to be in need of some structural repairs and timber lintels will tend to rot a little quicker if moisture is concentrated in them.

The main problem is that the areas of cracking and hollowness are apparent in the older renders but that any piecemeal approach is impracticable. Its not good practice to have different types of render and paint on the same elevation as moisture would be trapped behind the junctions and there would be a propensity to cracking there due to differential movement. In addition the aesthetic appearance would be harmed as the newly rendered lime plasters and mineral paints would contrast with the existing.

The stone plinth is in good condition and has been pointed with a cement rich mortar. To remove this and repoint with a breathable and more sympathetic lime mortar may cause more damage to the stone than is necessary.

Recommendations & Methodology

I've set out below the specifications and costings for replacing the external renders for each of the main elevations and the basis for costing any repairs that are required once the renders are removed.

For the external rendering, the options are either a traditional lime mortar or our ecoCORK insulating lime render which offers advantages including improved thermal and acoustic insulation and being lighter it places less stress on the important interface between the cob or stone substrates and render where delamination is more likely to occur.

Option 1. Traditional external lime rendering specification for the work is :

1. remove the existing render - removal and waste disposal
2. apply a harled coat of Secil Consolidation mortar to get a key to the wall
3. apply sufficient scratch coats of haired lime render to achieve a suitable surface
4. apply a float coat of unhaired lime render to achieve the contours of the walls required.
This can be left as a relatively smooth floated/sponged finish

Lime putty mortars for plastering and rendering are based on mixtures of our own mature lime putty with a coarse sand. Harling coats are made to a wetter consistency to allow hand harling on the wall. All external coats apart from the harled coat typically have a pozzolan added. This is a calcined clay used to accelerate the set whilst carbonation of the lime proceeds more slowly over the months and years.

Backing coats of lime render have added horse hair. Apart from the harling coat which is usually ready in 1-2 days, the subsequent coats of lime plaster or render take at least a week between coats to cure sufficiently for the next coat to be applied.

Option 2 . EcoCORK external lime rendering specification for the work is :

1. remove the existing render – removal and waste disposal
2. apply a harled coat of Secil Consolidation mortar to get a key to the wall
3. apply a doubled up scratch coat of Secil ecoCORK with an embedded glass fibre mesh.
4. apply a float coat of Secil ecoCORK
5. apply a finishing coat of Secil finish mortar which is a sponge float finish

The harling coat is typically ready to render onto after 1-2 days.

The scratch coat of Secil ecoCORK will take 3-5 days to cure before applying the ecoCORK float coat. This is left to cure for a few days before the finishing render coat is applied.

Ideally the final render coat is left to cure for several days before being painted.

External Paint

Either limewash or a mineral silicate paint can be used. Limewash typically needs four coats to cover but is a very cheap paint. Mineral silicate paints cost more but only need three coats.

They offer a similar appearance to limewash, are only slightly less porous but considerably more water repellent and so more protective. Silicate paints typically last longer when applied to a suitable substrate. This can be important for elevations that are difficult to decorate without the expense of scaffolding. A silicate paint, although matt, would match more closely the appearance of any retained paints as they don't mottle as much as limewash due to their greater water repellency.

Prices

Prices include all labour, equipment and materials.

- Any agreed additional items of work are chargeable at £34/hour based upon an 8 hour day including 2 breaks of 30 minutes per day.
- Materials supplied by ourselves are charged at trade prices.
- 3rd party materials are charged at trade prices + 10% handling
- we trust that water, electricity and toilet facilities can be made available for our site staff, if not a site toilet can be arranged at an extra cost.

We may need to store some materials on site.

Planning/Building Regulations etc

The proposed works may require appropriate permissions from the local council, from whom advice should be sought in advance of any work commencing and any necessary approvals given in writing.

North Elevation - Approx 12sqm

Item	Description	Total
1	Remove render, waste disposal, harl, one or two scratch coats and float coat in either traditional or ecoCORK render,	£1,740
2	Apply either 4 coats of limewash or primer + 2 coats of silicate paint to the new render	£360
3	Strip concrete tiles, waste disposal, inspect roof structure, batten, felt and slate – approx 24sqm	£3,632
3a	As above – neighbours roof – approx 32sqm	£3,744
4	Scaffolding at cost, budget estimate only	£500
5	Structural repairs to walls, lintels etc	rates

West Elevation – Approx 54sqm

Item	Description	Total
1	Remove render, waste disposal, harl, one or two scratch coats and float coat in either traditional or ecoCORK render,	£7,830
2	Apply either 4 coats of limewash or primer + 2 coats of silicate paint to the new render	£1,620
3	Scaffolding at cost, budget estimate only	£600
4	Structural repairs to walls, lintels etc	rates

South Elevation (including porch) – Approx 35sqm

Item	Description	Total
1	Remove render, waste disposal, harl, one or two scratch coats and float coat in either traditional or ecoCORK render,	£5,075
2	Apply either 4 coats of limewash or primer + 2 coats of silicate paint to the new render	£1,050
3	Scaffolding at cost, budget estimate only	£500
4	Structural repairs to walls, lintels etc	rates

East Elevation – Approx 47 sqm

Item	Description	Total
1	Remove render, waste disposal, harl, one or two scratch coats and float coat in either traditional or ecoCORK render,	£6,815
2	Apply either 4 coats of limewash or primer + 2 coats of silicate paint to the new render	£1,410
3	Scaffolding at cost, budget estimate only	£450
4	Structural repairs to walls, lintels etc	rates

It may be more cost effective to have the windows fitted by the supplier which will need co-ordinating with the external rendering works. If the chosen replacement windows are timber we recommend WD Joinery who will make and fit your windows in co-ordination with our team. Wayne can be contacted on 01237 421164 for quotes.

VAT at 20% is applicable to all items.

We don't ask for deposits in advance, we invoice when the work is completed.

We pride ourselves not only on the quality of our work and the stunning appearance of our projects after completion but in ensuring that our site team maintain good communications throughout the work.

As well as our site staff the works will be coordinated by myself and I will be the point of contact whilst the works are undertaken.

As we specialise in sympathetic repairs and restoration we advise booking any works that you wish to commission us well in advance. We are already booking into Summer of this year but as our commitments stand we could schedule you in once you have given us confirmation.

If you have any questions or comments please don't hesitate to get in touch.

Yours sincerely



Mark Rees

Conservation Team Manager

DEBI Awards – Sustainable and Overall Winners 2016

Build It Awards – Best Builders Merchants for Self Builders - Winner 2016

Rural Business Awards – Manufacturing Winner 2016

Federation of Small Businesses 2007 Business Champion Award Winner – Manufacturing

Peace of Mind

Both for our clients peace of mind and our own we carry comprehensive insurance cover as follows:

Public Liability - £5 million

Products Liability - £5 million

Employers Liability - £10 million

Contract Works - £480,000

As well as our enviable reputation, Mike Wye & Associates Ltd are also members of two Government certified schemes for the building industry:

Constructionline - membership shows that we have met the requisite standards for Customer Service and hold appropriate levels of insurance for Construction Work

Acclaim - membership shows that we have met the requisite standards for Health & Safety

If you'd like to find out about our previous work the following clients can be contacted.

Carol & Gareth Halsall	Owlacombe Mill, Roborough	01805-603501
David & Penny Ross	South Yeo, Poughill	01363-866401
Heather & Richard Hales	Lower Corscombe, Okehampton	01837-849387
John & Sue Bonnett	Hole Farm, Whiddon Down	01647-231119
Sue Dyer & Terry Edwards	Steele Farmhouse, Week St Mary	01288-341083
Faye Sutton & Steve Connop	Spring Cottage, Coombeinteignhead	01626-873155
Malcolm Jordan & Una Allman	South Woodtown, Dolton	01805-804413
Ken Stoate	Mutton Hall	07791-717053
Keith Shawe	Little Hill Cottage Weare Giffard	01237-422909
Paul & Lynn Sweeting	Honeycroft Farm, Holsworthy	01409-261762
Matt & Rachel	Damson Cottage, Sheepwash	01409-231718
Cheryl Watson	Chantry Cottage, Coombeinteignhead	01626-872919
Anthony Rowe	East Youlden, Chilsworthy	01409-241046
Simon Booth	Foxhole Farm, Halwill	01409-221287
Paul & Alison Mapp	South Newton Farm	01769-615008
Roger & Margaret Nightingale	Beardon Cottage Boyton	01566-785325
John Head	Little Downicary, St Giles	07505-395035
Bill Reynolds	The Barton Sampford Courtenay	01837-82287
Diana Bell	Peartree Cottage East Budleigh	01395-446893
Mr & Mrs Salter	Cadbury Cottage East Budleigh	01392-445929
Geoff Cooke	Round House Barn, Bratton Clovelly	01837-871110
Annette Matthews	8 Church Street Kenton	01626-890249
Sarah Grigg	Salterns Barn	01237-473211
Laurence Kerr	Southwood, Marhamchurch	01288-361928
Mr & Mrs Honeysett	2 Toits Cottage, Umberleigh	01769-540591
Mr Taylor	Townsend House, Winkleigh	01837-83260
Simon Coleman	Chestermoor, Broadbury	01837-871649
Bob & Helen Chapman	Stables Cottage, Oxtou	01626-891693
Sandra Frith	Roseworthy Cottage, Ashwater	01409-221142
Paula & Rob Clarke	Snows Cottage, Newbuildings	01363-85404
Jill Drury	Tadworthy House, Northam	01237-477501
Robin & Diane Hellis	Barnfield, Higher Prestacott	01409-211047
Pat Freeman	Keswick House, Winkleigh	01837-83165
Mr & Mrs Rowe	East Totleigh Barton	01837-810963
James Colville	Penheale Manor	01566-785693
Brian Wilmot	Cott House	01769-520708
Diana & David Lunn	Lower Broadwood	01769-560085
Nick & Gill Unstead	Rowan Tree Cottage	01363-84069
Mr & Mrs Eland	Stapleton House, Langtree	01805-601255
Jeremy Loysen	2 Blackmoor Cottages	01363-772991
Pat Constable	Foxhill, Petrockstowe	01805-601422
Miranda Collett	2 Merrymeet Cottages	07779-746615
Angie & Paul Morphy	Buckland Mill,	01409-281862
Mr & Mrs Roy	Dawnmoor, Bulkworthy	01409-261267
Peter Raby	Rowden Cottage, Shebbear	01409-281501
Sheena Gibson	Yew Tree Cottage, Christow	01647-252883
Steve Tyler-Upfield	Bedport Farm, Burrington	01769-560592
David & Sue McGregor	Cherrils, Inwardleigh	01622-729507
Peter Goodchild	Dunchideock House	01392-833535
Phil Martin	Willesleigh Cottage, Goodleigh	01271-322224
Philip Jordan	Stable Cottage, Dunchideock	01392-832580
Julia Rees Doherty	Culverhill House	01769-581341

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Notes on repairing cob, lime rendering, lime plastering, limewashing and lime pointing

Cob, as a building material, is of relatively poor strength in compression and tension. Cob walls are made from local subsoils which have to contain sufficient clay to bind the material. Straw was often added to allow the mixed cob to be more easily lifted onto the wall. It also added some tensile strength and reduced cracking as the cob mix dried.

Cob walls get their strength from the thickness of the walls, generally a minimum of 600mm and often up to 900mm thick at the base, and their relatively low height. They were mostly built in a series of lifts of cob around 450mm at a time, going round the whole building and creating a monolithic structure. Window and door openings were typically small and sometimes offset so that the integrity of the structure was maintained and independent pillars of cob avoided. Ideally cob walls are built off a stone plinth of a height of at least 900mm with good drainage away from the footings and foundations which were often shallow. A good covering of thatch, together with lime renders and limewash externally protected the cob from the weather and allowed any moisture to evaporate away from the walls. Even bare cob walls can survive for many years unless rain gets in from the top of the wall or vermin create too many holes. The clay content of cob tends to expand and contract with water content and so the cob will tend to swell and shrink as it draws in moisture from penetrating rain, rising moisture from the stone plinth or condensation. This puts a stress on any external render which can cause hairline cracks and once more rain has then got in through the cracks the problem can become a vicious spiral of decay. If there is an expansive nature to the clays in the cob walls then even new lime render can be subject to hairline cracking. The advantage is that as the whole surface is breathable, moisture can evaporate away from the wall rather than be concentrated in the vicinity of cracks. If the cob wall's moisture content exceeds 10% the compressive strength of the cob begins to fall dramatically and this can cause problems with wall stability.

When analysing defects in cob its important to understand as much as possible of the history of the damage. Cracks occurring from settlement 50 years ago can often be less serious than a small crack thats recently opened up. If 20 tonnes of gable are pulling away from 30 tonnes of elevation, infilling cracks is largely cosmetic and often more substantial measures are called for such as rebuilding the section, buttressing and tie bars. On the other hand, for older settlement which has resulted in cracks in the cob, the structural risk now is often low and its best to minimise the intrusiveness of repairs by retaining as much of the existing cob as possible. There is no point to removing substantial sections of sound existing cob to replace it with cob blocks/cob bricks making a small repair into a large one. Its often better and cheaper to infill the cracks with cob bricks or stone bedded in a lime mortar. In addition, modern cob blocks can often have higher clay contents than the original walls. This can lead to bonding issues with an external lime render onto the cob block surface. Similarly using reconstituted cob for repairs can have drawbacks as these need to be wet enough to form a bond with the existing wall and the clay content can lead to localised shrinkage at the junctions. There is a risk that differential moisture and thermal movement can lead to delamination of such surface repairs.

Similarly the approach of rammed earth repairs has drawbacks. Its rarely possible to shutter up the local area of repair in such a way as to impart sufficient force. Rammed earths can also have a higher density than the surrounding cob, leading to differential movement and cracking in the lime renders and lime plasters.

We are not advocates of embedding vertical timbers in cob repairs as movement in the timber over time will cause the cob to crack and introduce structural weaknesses.

Underpinning cob buildings can be a risky practice in the case of cob walls. If the foundation isn't sound and there is damage to the stone plinth and cob wall above, then introducing a concrete foundation and concrete blockwork at the base of the section of wall in question may have longer term implications for the sections of wall not underpinned due to changes in the stresses in the adjoining stone plinths. There are risk elements associated with supporting the defective cob above as bracing may not provide sufficient restraint to vertical movement. The extent to which some of the cob walls have survived despite being eroded away to often a minimal thickness is testament to the strength cob gains from its monolithic construction. The cob higher up the walls has to be structurally sound enough to withstand the stresses of trying to remove and underpin the lower sections of stone plinth or cob.

There is a methodology statement for cob repairs and the use of cob blocks on our website under Repair Guidesheets. If repairs are shown to be necessary, we try and rebuild with recycled cob from a damaged structure if possible, if the material is relatively free from contamination and local sources of suitable sub-soil available. It requires more space and machinery for mixing and placing the cob in position. This method is less viable for small scale or surface repairs due to the issues of bonding and shrinkage but comes into its own on large scale repairs of large sections of wall where its possible to build returns or partition walls at the same time from mass cob. This increase the structural strength of the mass cob rebuild substantially and more closely matches the original method of constructing in mass cob. Mass cob rebuilds are less feasible where an existing roof structure has to supported by the wall to be rebuilt.

In summary :

1. Cob blocks for repair should be bedded on flat horizontal surfaces as much as possible
2. Damaged and unsound cob on adjoining surfaces must be pared back
3. If necessary additional stainless steel 450mm helifix ties can be used to provide an additional mechanical key to the existing cob, these are located in the bedding joints
4. Damping of the existing cob blocks and cob surrounds is important to control suction
5. The bedding mortar is a lime mortar, often a hybrid of lime putty and natural hydraulic lime to provide a similar compressive strength and porosity as the cob
6. The surface of the cob blocks is distressed to give a better key for the external lime renders and internal lime plasters.

Lintels – the decayed nature of any wooden lintels, joists or bearers in contact with the cob has to be assessed. We typically suggest replacement timbers should be of oak to ensure compatibility with the original structure.

Our suggested internal lime plastering specification for the work is :

1. remove any existing failed plasters etc if applicable
2. harl an initial coat of lime mortar to get a key to the wall
3. apply one or two backing coats of haired lime plaster to achieve a suitable surface
4. apply a float coat of unhaired lime plaster, devil float finish, to achieve the contours of the walls required.
5. Apply a final skim of fine lime plaster with a trowelled finish

This should give an overall average thickness of around 20-35 mm though it will vary considerably between defective areas of cob and flatter areas of stonework, brickwork or blockwork. For internal plasters a pozzolan may assist curing where the site is exposed or the walls are likely to have a relatively high level of moisture.

In the case of lath and plaster onto timber frame the harled coat is omitted and there is usually only a single scratch coat of haired lime mortar. A gauge of natural hydraulic lime can be added to the scratch coat for additional strength in the plaster keys and the amount of hair is typically increased for ceilings.

Our suggested external lime rendering specification for the work is :

1. remove any existing failed renders etc if applicable
2. harl an initial coat of lime mortar to get a key to the wall
3. apply one or two backing coats of haired lime render to achieve a suitable surface
4. apply a float coat of unhaired lime render to achieve the contours of the walls required.
This can be floated or sponged as a finish.

Lime putty mortars for plastering and rendering are based on mixtures of our own mature lime putty with a coarse sand. Harling coats are made to a wetter consistency to allow hand harling on the wall and may have a small amount of natural hydraulic lime added to improve the set.

Backing coats have added horse hair and can have an additional additive known as a pozzolan, a calcined clay, used to accelerate the set whilst carbonation of the lime proceeds. Apart from the harling coat which is usually ready in 2-3 days, the subsequent coats of lime plaster or render take around a week between coats to cure sufficiently for the next coat to be applied.

We also recommend our insulated ecoCORK system which is a cork and lime insulating render (or internal plaster) which offers advantages including improved thermal and acoustic insulation and being lighter it places less stress on the important interface between the cob or stone substrates and render where delamination is more likely to occur. The renders are traditionally painted with a limewash or silicate paint.

If the stone plinth upon which a cob has been raised is of sufficient quality , its possible to leave this exposed and repoint the joints with lime mortar. Similarly a stone wall can have the lower 0.5-1m of wall left unrendered. This improves the situation regarding any rising dampness as

- the render is not in contact with the ground and so won't draw up surface moisture
- the exposed stonework offers maximum breathability at an important location
- any rain splashing up from the ground can't easily discolour the stone which can also be treated with a water repellent to minimise rain ingress.

Limewashing

After applying the final coat of lime plaster or lime render, its usually possible to begin limewashing within a week or two, depending on the time of year. Three coats of limewash are typical inside, four coats outside. Our limewashes are made from our own fine Buxton lime putty with a little raw linseed oil added for improved consolidation and water shedding. We supply a range of 54 colours or also match specific colours where required. As with any external painting system limewash requires periodic redecoration. A north facing elevation together with a porous lime render & limewash is a combination that can be subject to mold and algae over time and will need washing down with a fungicide/algaecide from time to time.

Silicate Paint

Mineral silicate paints cost more but only need three coats including a primer. They offer a similar appearance to limewash. They are almost as breathable as a pure limewash but offer much greater rain water repellency. Hence they are much more protective and typically last longer than limewash when applied to a suitable substrate. This can be important for elevations constructed of cob or cob blocks where the substrate is vulnerable to higher levels of moisture and for elevations that are difficult to decorate without the expense of scaffolding. We supply a range of 60 colours in our SecilTEK range or can also match specific colours where required. As with any external painting system silicate paints will require periodic redecoration.

Our lime repointing specification for a solid stonework wall is:

1. rake out existing joints to an appropriate depth of 20-25mm as necessary
2. brush out any dust and spray the back of the joint with water and leave to dry
3. if necessary, dub out any deep holes with an initial pass of lime mortar.
4. Repoint with a lime mortar with an appropriate graded sand.
5. Tamp and brush the mortar joints when green hard to expose the aggregate

Lime mortars for repointing can be based on two types of lime :

Lime putty based mortars are based on lime putty premixed with a coarse sharp sand. They are knocked up again on the day of use and a pozzolan added to accelerate the set and improve frost resistance in the first couple of winters. These mortars are more historically accurate for pre-1850 structures, they can utilise coarser sands and aggregates and their strength can be tailored by the amount of pozzolan added. They need protection from the weather for a relatively long period of several days and can appear very light when first pointed until they weather in.

Natural hydraulic lime mortars are based on a natural hydraulic lime powder which is mixed on site with a suitable sand. A little lime putty can be added to plasticise the mortar mix. Site mixing can introduce more variables into the mortar colour as water content can vary in the sands and sands may vary between batches. They tend to set a little earlier, depending on the strength of NHL used (there are 3 strengths). NHL mortars aren't so light in use and tend to blend in earlier with existing mortars. They really came into use from the 1850's onwards.

A little linseed oil (raw or double boiled) can be added into the pointing mortar which can help to reduce rain ingress through the bedding mortars whilst still leaving the mortar breathable.

We also supply a particularly effective water repellent, MWR400 that can be sprayed onto stone, brick or plaster to help minimise rainwater ingress whilst still offering good vapour permeability so that the walls can still breathe. Water repellents have historically been often frowned upon in conservation circles because of concerns about any possible long term detrimental effects on the stone or brick, especially where a listed building is concerned. Most modern water repellents such as MWR400 are based on a mixture of silane and siloxane and offer a good combination of water repellency and vapour permeability whilst being resistant to UV light – a bugbear of earlier products which would often degrade in UV light. At the end of the day doing nothing isn't always a viable option as the moisture-laden stone or brick will continue to degrade due to frost and salt damage, abutting and embedded timbers will rot quicker and internal plasters and paints will suffer from staining, salt efflorescence and damp patches.