

HIGHER LICKHURST FARM – JOB No. 1735

PLANNING APPLICATION REF. 3/2013/0683 – DISCHARGE OF CONDITIONS

CONDITION 5 – Details and specifications of the extent of any repairs and re-pointing to the existing walls of the dwelling including the materials and methods to be used.

RE01 STONEWALLING ; RE-POINTING / REBEDDING STONE WALLS:

To be read in conjunction with Preliminaries and General Conditions.

100 MATERIALS:

- Sand generally to be to BS 1200. It shall be coarse and gritty in nature, free from harmful salts, e.g. well washed Mersey grit sand or “Chardstock” or “Sherbourne” grit sand. Sands for use in lime mortars should be clean and uncontaminated by clay/ silt.
- Samples of sand to be submitted to the Architect and provide samples of mortar using preferred sands for approval before work commences. Sand should be chosen to be an appropriate colour, well graded, with a maximum particle size 1/3 of the joint width. Depending on the size of the joint, sands from 6mm down to 0.075 can be used, with a proportion from 0.150 to 0.075 about 20% of the mass.
- Sand and vapour permeability of the mix: The colour of lime mortars will be given by the fines contained in the sand, which is not always appropriate for the mix. A high proportion of these sands in lime mortars will lead to longer setting time, possibility of shrinkage, lime leaching and more sensitivity to adverse weather conditions.
- Sands are mostly responsible for the void structure of lime mortars and, therefore, for its vapour permeability, vital for the performance against accumulation of condensation.
It is for this reason that well graded sands are recommended. If sharp, the void structure will be even more efficient. At least 4 grades should be used.
- Monogranular sands (particle size mainly between 1 or 2 grades) will not allow good vapour exchange, they will also diminish workability of lime mortars and therefore increase the danger of too much water addition in order to achieve it. In making NHL mortars with good sand, workability should not be achieved by adding more water but by allowing a little more time for mixing. It is also advantageous, if time permits, to let lime mortars rest for a while: the water will settle between the particles and allow better hydration of the free lime content resulting in a fatter, more homogeneous and workable mortar.
- Admixes Admixes, plasticizers, etc. will not be allowed as a substitute for lime or to produce a more workable fatty mix for ease of use.

200 LIME

- Lime is to be natural hydraulic lime powder to BS EN 459 delivered to the site in sealed 25 kg bags (or appropriate sizes of bags supplied by manufacturer).

300 Water to be from very clean spring source or Local Authority mains supply to comply with BS 3148.

400 COURSE STUFF

- Natural Hydraulic Lime (NHL) mortar is to be mixed as recommended by one of the main suppliers “St. Astier” (comprehensive information on their website: www.stastier.co.uk) and mixing recommendations summarised as follows:
NHL Mortar preparation can be mixed in normal cement mixers.
St. Astier recommend with use of small mixers:
 1. Introduce half the sand.
 2. Add all the lime. Mix well about 2 minutes until uniform in colour is achieved.
 3. Add remaining sand. Mix well again (2 minutes)

4. Continue mixing until required workability is achieved adding water slowly. Time of last mix: approx. 10 minutes.
- St. Astier recommend with larger mixers:
 1. Introduce equal parts of the required sand.
 2. Add equal part of lime. Mix well about 2 minutes until uniform in colour is achieved.
 3. Add more sand in equal parts. Mix well again (about 1 - 2 minutes).
 4. Mix DRY for 2 minutes to homogenize and then continue mixing adding water slowly until workability is achieved. Approx. 12 minutes.
 - Note: Best results are achieved by adding water slowly. Mortar should be more like a dough than a slurry. The longer the final mixing time, the more workable (fatter) the mortar will be.

Re-working: St. Astier NHL can be reworked for up to 24 hours. It should be covered to avoid contact with rain or sun. When re-mixing lime mortar add the least possible water (in some cases it is not necessary to add any). The tradesmen's good judgement is required.

- Mortar Protection:
New mortar pointing is to be allowed to cure from its wet application state into a fully functioning mortar. To assist in this process adequate protection must be given to mortars during and after their application until the mortar is sufficiently cured to perform its designated function.
- Protection starts before the work takes place: properly installed drainage, roof membranes, gutters etc should all be in working order to avoid water ingress and over saturation of fresh mortars.
- During and after application, protection should be in place for as long as necessary for the mortar to firstly cure properly and then, dry sufficiently. The moisture content of the cured mortar should be measured before protection is taken down. As a general rule this should be about 8%.
- Moisture, present in saturated walls, prior to the commencement of work should be allowed to dry out properly. In circumstances where this is not entirely possible, the mortar used should have the best possible void structure to allow the maximum evaporation to occur through the mortar. This may require a change in the mortar specification, either of the binder/ aggregate ratio or the aggregates or both, and should be treated as a design consideration at sample stage in consultation with the Architect.
- The use of well graded sharp sands with a good part of coarse content (10-15% of 4 or 5 mm) will allow the moisture to pass more readily through the mortar and the wall to dry quicker.
Mortars, such as finished renders with finer sands, tightly finished, will reduce the vapour permeability. Best practice is to leave the face of the new work "open" and not "closed" tightly. In joint work it is recommended to stipple or scrape the face of the joint.

Mix: Mortar mix: prepare three or four one metre square mortar pointing samples using alternative sands for colour and appearance choice and POINTING MORTAR: HYDRAULIC MORTAR MIX: based on natural hydraulic lime (NHL)

Strength for copings: NHL 5 (2 N/sq.mm @ 28 days.)

Strength for walling: NHL 3.5 (2 N/sq.mm @ 28 days.)

Mix: 1 : 2.5 (Lime : sand) - pointing mortar and render (no cement to be used).

Note: for the relatively small areas of new masonry the bedding mortar should be stronger than the mortar for pointing: use NHL 3.5 Mix: 1 : 2 (Lime : sand). Refer to extract from health and safety file for 2005 repair works.

Lime mortar is not to prepared and applied in weather conditions that will result in the mortar being exposed to either frost action or excessive drying. The exposure of the site to adverse weather conditions is also a major consideration in the design, specification, planning and execution of the work. The principle factors are: a) Rapid drying caused by: direct sun, heat, wind, b) Insufficient drying caused by: excessive rainfall, low temperatures, humid/damp conditions, c) Freeze Thaw action

Where this is not possible provide a scaffold construction with sheeting on the outside against rain/wind and hessian sheeting on the wall. Again attention should be paid to detailing, roof, drainage and gutters. The same applies in structures where moisture is coming from within.

Should it be necessary to continue work during the cold season, adequate heating of the structure should be in place together with protected scaffolding system. Scaffolds should have close knit debris netting on the outside to provide shade without impeding ventilation.

SUN - Strong and direct sun can cause rapid drying and shrinkage. This effect could be aggravated in the presence of warm wind. In warm weather and active drying conditions, mortar is cured with light water mist 2 or 3 times a day to slow down any potential drying effect.

Wind chill effect.

Wind chill effect							
Wind	Temperature in C°			Wind	Temperature in C°		
Mph	+5	0	-5	Mph (m/sec)	+5	0	-5
	Wind chill effect				Wind chill effect		
4.3 (2)	2	-2	-7	26.7 (12)	-11	-16	-25
8.7 (4)	-1	-7	-12	31 (14)	-12	-17	-26
13 (6)	-4	-10	-16	36 (16)	-12	-18	-27
18 (8)	-6	-13	-20	40.3 (18)	-13	-19	-28
22.3 (10)	-10	-15	-23				

RAIN - Allowing mortars to be saturated by rain should be avoided for the following

Light and not continuous rain, provided that frost is not forecasted, will help to cure the mortar and can be beneficial especially in warm spells. Heavy rain, especially if detailing are poor or wind driven will not allow the fresh mortar to dry sufficiently to withstand frost unless adequate protection is in place

GENERAL

418 CONTROL SAMPLES

- Complete sample areas, being part of the finished work, in locations as follows: to be agreed in concealed location : two square metres

- 453 MIXING
- Render mortars (site prepared):
 - Batching: By volume. Use clean and accurate gauge boxes or buckets.
 - Mix proportions: Based on damp sand. Adjust for dry sand.
 - Mixes: Of uniform consistence, colour and texture. and free from lumps. Do not retemper or reconstitute mixes.
 - Contamination: Prevent. Keep plant and banker boards clean.
- 466 SCAFFOLDING (refer to scaffolding specification)
- General: Prevent putlog holes and other breaks in coatings.
- 492 HAIR REINFORCEMENT
- Manufacturer/ Supplier: Goats hair by Womersleys at Heckmondwike
 - Proportions (approximate): 5 kg hair to 1 m³ of coarse stuff.
 - Condition: Clean, free from grease and other impurities. Well teased before adding to the mix.
 - Mix: Well distributed throughout with no balling into lumps.
 - Storage period for haired mortar (maximum): Four weeks.
- 498 SPECIAL PROTECTION OF HISTORIC PLASTERWORK
- General: Minimize damage and disturbance to retained plasterwork.
 - Protection methods: Submit proposals.
Protect wall paintings.
- 500 WORKMANSHIP
- 510 Preparation
- The joints are to be carefully prepared so as to avoid any possible damage to the arrises. The depth of the raking out should be twice size of the joint width. Generally this would never be less than 25 mm in stone and 20 mm in brickwork. In positions of severe exposure and wide joints, a minimum of 38 mm or even 50 mm could be required. It is essential that the recess formed is left square.
 - Suitable tools are to be used and these include a bent screwdriver or spike to remove soft mortar but where the existing mortar is too hard, a hammer and claw chisel or toothed edged sculptor's chisel can be used with care using a 2.5 lb club hammer; a cold chisel will not be allowed. Impact is to be at an oblique angle to the joint face, not directly into it. The width of chisel used is never to exceed 2/3rds of the minimum joint width. For fine joints in ashlar or brickwork a mason's saw or hacksaw may be used. In no circumstances will a power saw of any description be allowed.
 - When raking out is complete, all loose material is to be brushed or gently washed out of the joints by hosing downwards with a fine spray.
- 520 Application
- Under no circumstances is pointing to be carried out in frosty weather, nor will anti-freeze agents be allowed.
 - Up to 4 no. Sample panels (approx. 1 sq.m) are to be prepared for approval by the Architect both as to colour and texture of mortar and finished appearance and contour of finished joint. Where possible the sample panels are to be in an inconspicuous position not directly on the main elevations.
 - Pointing is to commence at the top of the walls and work downwards, the work being cleaned down as it progresses and before the scaffolding is struck.
 - Before beginning re-pointing, the raked out joints are to be well wetted using an old flat distemper brush. The wall should not be soaked. Pointing tools are to be carefully selected, a flat pointing trowel is not desired as the finished joint must not show trowel

marks. A pointing iron cranked steel flat, beaten out rod or a piece of shaped hardwood is required.

Mortar of correct consistency can be lifted on a pointing iron. The mortar is to be pushed into the joint from a pointing iron and pressed straight into the joint with the maximum possible pressure. The mortar face should be filled flush but not so as to encroach over the arrises. The finished profile of the joint is then to be formed flush or very slightly recessed. The finished pointing should leave all arrises visible and joint widths should be strictly maintained; chips and irregularities of the stone face should be left exposed.

530 Surface Finish

- Pointing to be flush or very slightly recessed so that the mortar does not spread over the rounded edges of the stone. Pointing to harmonise in colour and texture with adjacent stone walls where appropriate, and be finished by stippling with a bristle brush to give a slightly roughened effect, or by spraying the mortar joint with a fine jet of water after the initial set, to remove the whiteness of the lime and bring out the texture and colour of the sand.
- Where pointing of stonework is being carried out, the face of the mortar is to be finished with a roughened texture to imitate as near as possible the texture of the stone; The mortar texture being left rougher in appearance than the stone. After the initial set has taken place, hitting the surface with a churn brush - with a stiff bristle brush used at right angles to the mortar face. The brush is not to be dragged across the face of the mortar.
- Alternatively, rubbing the joint with a piece of coarse sacking or the end of a stick could achieve the desired effect, the final appearance being to the Architect's approval. The intention is also to expose the fine sharp stones/ aggregate in the mortar.

540 Completion

- Cleaning down is to be carried out as the work proceeds by washing and brushing down after the mortar is set to remove all 'spots', splashes, etc. Protect fully adjacent materials and finishes and leave all surfaces clean on completion.