

Wrexham Miners Rescue Station.

Methodology Information to support an LBC Application

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for The Trustees of Wrexham Miners Rescue

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Section 1.0: Building Fabric Repairs

1.1 Background

Repairs to brickwork

The Contactor is to allow for further inspection by the Architect once full and safe access is available.

General

Brick sample for approval: Sample bricks to be provided to the CA for approval and determination of acceptable colour, texture and size differences. Samples are to be provided with sufficient lead time to ensure adequate quantities at the times required by the building programme.

Laying of bricks

Replication of bonding, coursing and joints: Repair/replacement brickwork is to accurately match the bonding and coursing of the existing. Joint widths and profiles are to be accurately matched.

Mixing bricks: New bricks and salvaged bricks are to be carefully mixed to ensure an even overall appearance for all replacement brickwork. New bricks from different consignments are to be mixed to avoid any patchy or banded appearance.

Joints and mortar

Character of pointing: The character of the pointing within each repair is to be match the original. In every instance, the mix of the mortar, its colour, texture and profile must be replicated.

Brick-mortar adhesion: All necessary precautions to be undertaken to achieve good adhesion between bricks and mortar. Newly laid masonry must not be allowed to dry out too rapidly in warm, dry conditions or to freeze.

Mortar replacement: Bricks to be laid on a full bed of mortar and all cross joints and collar joints filled. Back joints between cut back existing and new facing bricks to be filled. Excess mortar should not be scraped into weathered arises or the exposed face of the brick. Accidental smears should be lightly brushed off after the mortar has taken its first set.

Cutting out and dismantling defective brickwork

Each brick identified for replacement is to be cut out by hand. Angle grinders must not be used.

All cutting out and dismantling must not damage adjacent brickwork in any way. The CA reserves the right to cease a method of cutting out should this take place.

Whole bricks are to be removed, including the surrounding mortar to the bed, perpend and back joints. The faces of adjacent bricks must be cleaned ready to receive the new mortar and brickwork. Maintain necessary protection from water and other damages throughout.

Inserting new brickwork

Clean out newly exposed opening. Rebuild with new approved or reused bricks. Wet brick and brickwork thoroughly before rebedding. In dry conditions keep it damp as work proceeds to prevent de- watering of the mortar.

Ensure that the joints are kept full, especially the last joint which may be underpinning existing work. Set mortar back for future render or pointing.

Follow original coursing and bonding as recorded. Ensure that joints are not widened during construction. Keep mortar damp for first three days in summer and at least 1 week in winter by providing ventilated covers eg hessian sacking and spraying with water and covering with polythene sheets / bubble wrap. Rockwool building mats for winter use. Note: these times are minimum times and longer times are desirable. No mortar work to be carried out in frosty weather, when the temperature is below 5 degrees c on a falling thermometer or below 3 degrees c on a rising thermometer to allow slow curing.

Replacement Bricks

Repairs to the external brickwork to be undertaken in face bricks, in accordance with BS 3921: 1985 Specification for Clay Bricks.

The colour, size and surface texture of the replacement bricks are to match the existing accurately.

Brick are to be free from deep or extensive cracks, from damage to edges and corners, from pebbles and from expansive particles of lime.

Pointing and Repointing

Generally

Mortar that is used in repair work should be of similar strength and porosity to the existing sound mortar and should never be stronger than the adjoining stonework. Provide sample panels of pointing consolidation and finish for Architect to approve. The mortar colour for pointing consolidation works is to match existing in all respects. All new mortars shall match original mortar in colour, texture and detailing.

Mortar Samples

The Contractor is to allow for the Architect to approve the colours of mortar mixes before commencing, and providing sample panels, as directed by the Architect, of pointing 0.5 sq.m for approval of colours and workmanship. Area, location, number, size and requirements of each panel are to be agreed with the Architect prior to work being carried out.

The approval for obtaining a palette of mortars / mortar samples will be subject to dried mortar samples on the basis of a) broken samples, and b) wall samples showing the completed finish / joint treatment.

Approvals

The Contractor is to allow sufficient time in the works programme to obtain approvals from the Architect for the following:

1. Cutting and clearing out before consolidation of pointing. All areas are to be selected and agreed with Architect.
2. Approval of lime putty, aggregates and, if required, gauging material. Coarse stuff prior to gauging and approval of method
3. Approval of tools
4. Test areas of pointing, supervision of selection and undertaking of this.
5. Test area to be retained throughout the works for comparison.

Pointing Consolidation Works

Where work is to have all pointing consolidation, the intention will be to replace any loose or missing mortar, to ensure water-tight joints as deep as possible to the depth of the wall and to ensure all mortars are thoroughly packed, well tamped and consolidated.
Variations in mortar colours are to be achieved without any deviation from specified mortar mixes, by selecting the well graded sand of differing colours which may be used in the Coarse Stuff mix.

Materials

Water

Water is to be clean, obtained from mains supply, and is to be conveyed and stored in clean containers. Water containers are not to be used for any other purpose (e.g: not for washing utensils or mixing materials). Water is to be tested to BS3148 if required.

Sand

Sand is to be clean, sharp, pit fresh-water sand, free from loam, salts, organic matter and other impurities, and in accordance with BS1198, 1199 and 1200: "Building Sand from Natural Sources".

Sand is to be selected for colour, for use in the Coarse Stuff mix to achieve required shades of mortar mix colours, and to match existing where specified.

Sand for self-coloured mortars is to be from one source. Different loads are to be mixed if necessary to ensure consistency of colour and texture.

All sand is to be graded by sifting through a stack of sieves in accordance with BS410.

Pozzolanic Additives

Slate dust and brick dust is to be provided from an agreed source to match the existing work as appropriate, primarily to obtain a set.

Red brick dust available from Gabriels Ltd tel: 01902 883161 or Butterley Brick Ltd, Newark, Nottinghamshire.

Delobole slate dust: Available from RTZ Mining & Exploration Ltd, Pengeley Rd, Delabole, Cornwall, PZ33 9A2. Tel 01840 212948.

Hydraulic Lime

Hydraulic lime is only to be used when specifically instructed by the Architect, and is to be from an approved source.

The lime is to comply with the proposed European standard for hydraulic lime 'NHL', i.e. it is to be naturally hydraulic and must not contain any additives.

Hydraulic lime is to be purchased as a dry bagged hydrate and must be stored in dry conditions.

If the mix is too 'sharp' an addition of up to 10% of lime putty will be permitted.

Unspecified additives

No plasticisers, workability agents, anti-freeze compounds, air entrainers or other additives are to be used unless expressly instructed by the Architect

Mortar Mix Proportions

Proposed mortar mix for repointing is

1part NHL 3.5 lime: 1part crushed stone: 2parts Leighton Buzzard sand

A control sample panel is to be prepared for Contract Administrator approval with 2no. variations of mix .

Workmanship

Samples

The Contractor should allow for the preparation of samples of all types of mortars required to the satisfaction of the architect prior to carrying out any of the main works.

Samples of mortar colours and textures are to be prepared to enable accurate matching to the existing fabric of the building.

Locations, dates and exact details of all trials and sample mixes are to be recorded in all cases, and the records copied to the architect, as well as being kept permanently available on site for reference.

Personnel

All work is to be carried out by appropriately trained and experienced personnel. Details of each person's qualifications and experience should be forwarded to the architect before commencement on site.
Pointing and repointing work in particular should be carried out by a consistent team of masons/conservators throughout the contract in order to ensure consistency, as work by a different "hand" can be very obvious. Similar work on equivalent sections of the building should be carried out by the same person or team to avoid changes in effect. New masons/conservators joining the project after its commencement will be required to prepare a range of samples for the approval of the architect before commencing any of the main works.

Inclement Weather

No wet trades are to be carried out in frosty weather, when the temperature is below 5°C on a falling thermometer, or below 3°C on a rising thermometer.

Protection

Provide all protection to the works as necessary to prevent any damage to completed works or from following trades.

Provide protection to all mortars to allow slow curing and complete carbonation prior to exposure to wind, rain, frost or direct sunlight. Protection for at least four weeks should always be provided. In winter protection should be allowed for as long as possible: ideally the works should be programmed so that no mortars are subjected to frost in their first season. The architect may require removal and replacement of any mortars where premature exposure to frost is suspected.

Pointing and Repointing

Cutting Out

Defective pointing in joints to be cleaned out to twice the height of the joint.

Cutting out/raking out is achieved using quirks, plugging chisels, long necked jointing chisels and toothed masonry chisels, with a 2½lb club hammer but never with chisels which tend to wedge the joints and cause spalling. Hacksaw blades and masonry saws may also be used and drilling with masonry drills, without the hammer action, is a useful way of creating an initial breach in strong mortar. The use of disk-grinders/cutters and other power tools for cutting out defective pointing in joints or cutting chases in stonework will not be permitted under any circumstances.

All cutting out to leave a clean, square face at the back of the joint to provide optimum contact with new mortar. Compressed air is to be used where necessary to clear out the raked joints before flushing with clean water to remove all debris.
All cut out joints are to be inspected by the CA before any re-pointing work proceeds. The Contractor to give 1 working week (5 working days) notice for inspection.

Cleaning the Joint
The prepared face is to be cleaned out with a soft stiff bristle brush and thoroughly flushed out with clean water, avoiding unnecessary saturation and washed with formalin to sterilize the joint.
All dust and loose materials must be removed, working from top to bottom of the wall.

Filling the Joint
The Contractor's attention is drawn to the need of re-wetting the stonework prior to pointing due to the stonework drying out excessively under a temporary roof or during hot weather during the course of the Contract.
Joints to be re-wetted before placing the new mortar.
The mortar is to be pushed into the joint from a board, held at joint level and ironed in, with pointing irons purpose made to fit into the joints, with the maximum possible pressure. The surface is then to be scraped with edge of small pointing trowel to raise the texture.

Finished work to be protected from frost action, direct sun and rain for a month, until the face has dried and hardened. "Rock-wool building mats" and "bubble polythene sheets" are to be used against frost. "Hessian sacking" is to be covered over the pointed areas, sacking to be mist sprayed at least three times daily with water for a minimum period of two weeks to promote carbonation of lime mortars by wetting and drying cycles.
A roughened texture is to be produced after initial set of the mortar has taken place, with joint slightly recessed, and is to be finished by tamping with the bristle ends of a brush but not brush finished. Only bristle or phosphor bronze wire brush to be used.
No voids to be left behind new pointing. New pointing to be cut out for inspection at positions selected by the CA and made good.

Jointing
Finish exposed joints neatly as the work proceeds. Note that joints are generally recessed, and new pointing is to match original work. The depth of recess is specific to each structure and is to be agreed in advance with the architect. Samples are to be prepared to match.
No brush marks are permitted on the pointing. Weathering fillet to wall tops

Pining plaster

To remnants of former internal plaster around window reveals:
At 300mm centres carefully form a 25mm diameter 4mm recess into the plaster. Using a 6mm drill bit drill a hole through the plaster into the brick substrate. Insert nylon plug into brick Secure stainless-steel screw through plaster into plug with 25mm stainless steel penny washer with wire mesh washer on outside face to provide key. Patch over with fine repair plaster. Sample to be prepared for Architect's approval.

Timber Repairs

Pieced-in repairs to structural timbers:
Cut out defective sections as instructed by CA and piece in with new well-seasoned timber of size to match existing. All new timber to be preservative treated as specified in general clauses.

Reform all existing joints to match. Otherwise use fine mortice and tenon joints wherever possible unless otherwise specified. Where new timbers have to be inserted within an existing fixed framework, swung tenons and elongated mortices may be used and blocked in on completion. Alternatively, where appropriate, loose tenons may be used. Where possible mortices in new timbers should be made to leave a minimum 38 thickness of timber externally.
Adhesives are to not be used at joints between different timber members and are not to be used on pegs.

Second-hand Timber
Where partial renewal or repair calls for the use of new timber in association with old, the ideal is to use reasonable second-hand material that has had an opportunity to age under similar circumstances to that which is being repaired.
The timber selected is to be sound and perfectly free from decay and to be approximately the right scantling.

New Timber
If right second-hand timber is not available, then new timber may be introduced, and it must be selected with great care.

1. The replacement type of wood must match the original.
2. The quality and grain must match the original.
3. The moisture content must match the original.

It is imperative that points 1-3 are adhered to in this case as the new will be bonded to the old with an adhesive: otherwise, seasonal movements will produce twisting and distortion out of all proportion to that which might normally be expected.

Existing Roof Coverings and Upgrades

Existing slates/tiles to be retained and repaired where applicable. Contractor to recover existing roofs with reclaimed slate/tiles to match existing and to Local Authority Conservation Officer approval. Any replacement ridge tiles are to match existing and to be bedded in a lime and sand mortar. Roof timbers to be inspected by nominated contractor for adequacy. Roof timbers to be retained as far as possible and repaired where applicable. Timbers can be spliced in or metal plates attached to ensure they are structurally sound rather than replacement. If required to be replaced, contractor to install timbers on a strictly like for like basis. Please refer to Bingham Rawlings Partnership details and specification for structural timber repairs, but also for the repair of the existing steel trusses.

Where cold roof constructions are being retained, 100mm thermal quilt insulation to be laid between joists and a min. 200mm layer to be laid across the joists to achieve a min. U-value of 0.15W/m²K Where break in ceiling profile exists, minimum of 50mm PIR insulation to be fitted between rafters with min. 50mm clear ventilation gap over. Where ceilings have already been lost, min. 100mm timber to be planted on the underside for 150mm PIR to be fitted tightly between timbers and a 50mm clear ventilation gap retained over.

Upgrading of the existing Drill Hall roof to include the recovering of the existing slated roof covering on graded roofing battens, a counter batten and then the installation of a proprietary multi-foil insulation layer over the existing rafters, in accordance with manufacturer's instructions. Batten cavity to be maintained above the insulation and a non-ventilated cavity maintained beneath. Nom. 100mm PIR insulation to be installed between the existing rafters above the existing T&G lined timber boarded roof lining. Note, underside of the existing boarded finish will be coated with a proprietary intumescent decorative coating system to manage the surface spread of flame as BS EN Class B s1 d0 and complies with British Standard Class 1 and Class 0. Overall U-value to be 0.16W/m²K

New patent glazing and rooflights to be 18mm double glazed system with 6mm toughened glass has a safety rating of class 1-C-2 in accordance with BS EN 12600 and 6.4mm thick laminated glass obtains a Class 2-B-2 safety rating to BS EN 12600, 6.8mm thick laminated glass obtains a lass 1-B-1 safety rating to BS EN 12600. All laminated glass with a PVB interlayer at least 0.8mm thick obtains a Class 1-B-1 safety rating to BS EN 12600

All existing flat asphalt roof coverings, over the existing or new in-situ reinforced concrete roof structure to be a proprietary multi-layer reinforced bitumen membrane warm roof system, self-adhered, nom. 150mm thick and a U-value of 0.15W/m²K

Existing and New Windows and Doors

Where practicable, existing single glazed timber sash and casement windows to be repaired, overhauled and thermally upgraded with the introduction of proprietary brush seals and double-glazed secondary glazing, set in painted timber frames to archive a U-value of max. 0.46W/m²K. All glazing to also comply with Part N of the approved documents, glass also being toughened where sill levels are less than 800mm or where glazing is situated within glazed screens or adjacent to door openings.

New external timber doors to perform where possible to 2.5W/m²K, vision panels introduced to comply with Approved Documents Part M and and Frosted film manifestation fitted to be minimum two rows Part N compliant 400mm and 1400mm above FFL as a min. 50mm in size.

Door to frame/architrave finishes to have a min. 30 point LRV level of contrast as Part M of the approved documents

Painting and Decorating

Generally

Comply with BS6150 'Painting of Buildings'.

Type and make of paint to be agreed with CA and applied in accordance with the manufacturer's instructions.

Allow for sweeping out all rooms before applying coatings and protect all floors and fittings with sheets etc.
Make good any damage done to adjacent surfaces. Paintwork must be protected from debris, plaster, mortar, etc.
Anything which adheres to a primed, undercoated or painted surface must be removed and the surface made good before proceeding with the next coat.
All coats of paint to be thoroughly dry before the application of subsequent coats and to be rubbed down with sandpaper between each coat.

External painting is only to be done in good weather when it is free from moisture. All colours to be selected by the CA, subject to sample areas being prepared.

Metalwork

Thoroughly clean the surface to remove all dirt, grease etc. Remove all loosely adhering or defective paint by scraping back to a firm edge or, if necessary, completely stripping the surface. Remove all rust and loose millscale by chipping, scraping and wire brushing back to clean metal.

Prime all bare metal immediately with one coat metal primer. When primer is hard, paint with one coat undercoat and one coat gloss or oil based matt finish as directed.

External Render

Remove all loose material by scraping and bristle brushing. Areas where flaking has occurred should be removed and scaled back to sound edge. Rub down all gloss paint with glass paper. Following patch repairs allow new render to dry before painting with a proprietary, breathable Mineral Paint System.

Previously Painted Surfaces

If existing paint is generally sound, wash with soap and water, detergent solution or suitable solvent to remove dirt, grease, polish etc. Rub down gloss surfaces. Remove any poorly adhering or defective paint by scraping back to a firm edge.

Make good cracks and other imperfections and allow to dry thoroughly. Prime and make good all areas exposed by the removal of paint as described for new surfaces. If the existing paint is flaking, blistered, poorly adhering or generally in poor condition, remove it completely and treat the surface as described for new surfaces.

New Woodwork

Apply knotting solution to all knots, and sand when dry. Prime with wood primer, when primer is hard make good cracks etc Paint with one undercoat and two coats gloss or matt finish as directed with a proprietary micro-porous paint system for timber.

Existing Emulsion Painted Surfaces

If the existing emulsion paint is in good condition and firmly adhering clean down the surface. If in poor condition completely remove all the flaking, peeling and powdering coating. Make sure that all the remaining paint is sound and adheres firmly to its backing. Cut out and make good cracks and imperfections and allow to dry.

If the surface is very porous, apply a sealing coat of thinned finishing material. Alternatively, if, after thorough preparation, a residue of powdery material remains prime with 1 coat of primer sealer to reduce the risk of subsequent flaking.

Existing Plaster Finishes (including lime) to be coated with a proprietary, breathable Mineral Paint System. (NOTE – Existing brickwork finishes will remain unaltered)

New Plaster

Remove any plaster nibs, etc and stop in cracks or holes. Wipe off any deposits or efflorescence with a damp sponge and lightly abrade any over trowelled ‘glossy’ areas with worn abrasive paper. Dust off, leave to dry and ensure that no efflorescence recurs.

Where emulsion is specified, prime with a thinned coat of emulsion. Make good any defects with a plaster filler, rub down and patch prime with thinned emulsion. Finish with two full coats of emulsion specified as directed. New Plasterboard finished to be Trade Matt Emulsion New Lime Plaster Finishes to be a proprietary, breathable Mineral Paint System. (NOTE – Existing brickwork finishes will remain unaltered)

Ironmongery

Two coats primer, applied in the workshop, to be as recommended by the manufacturer for the surface to be coated. Allow minimum interval of 16 hours between priming coats.

Ensure all sharp edges, angles, corners etc are fully covered both in works and on site. Any damaged or unpainted areas are to be primed before fixing on site.

Undercoat colour to suit finish. As recommended by the manufacturer for the surface and paint system.