



Tŷ-Mawr
ecological building materials

Site Visit Report



Church of The Immaculate Conception Tredegar

February 2015

1. Introduction

This report has been prepared for Father Edmund by Sam Hale, Ty-Mawr Lime Ltd following a request to inspect the problems with failing stonework, water ingress and failing plaster within Church of The Immaculate Conception, Tredegar. The inspection was undertaken by Sam Hale on 28th January 2015.

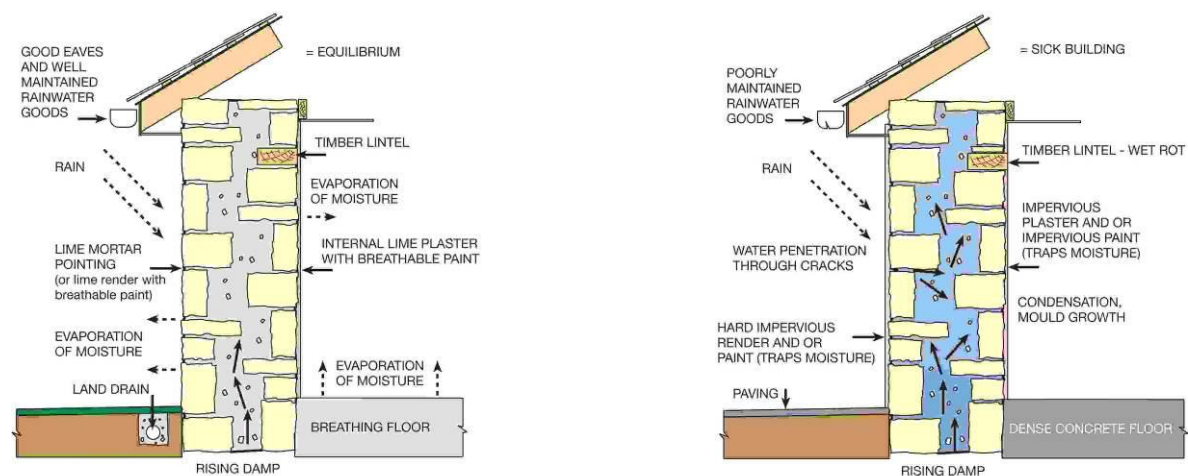
2. Description

The church was built c.1860. The church with connected rectory is cement rendered with an exposed stone west end and Bath stone dressings. Original lime mortar survives in places and has been replaced with cement in others.

Following a period of decay to coping stones on the gables and cracks in the cement render there has been sustained water ingress resulting in failure of internal plaster and blistering paint and salts on stonework.

Principles

This type of construction relies on the building being able to 'breathe' – i.e. to be able to release any moisture entering the building through weather, rising damp etc - see below, impervious materials, trap moisture and this build up of moisture can lead to problems associated with damp and condensation including mould growth, wet and dry rot etc. It is also important to consider the water/moisture management for the whole building so that as much water as possible is diverted from the building via effective rainwater goods, land drains, good detailing of joints etc to avoid problems associated with damp, plant growth, decaying fabric etc. This report will consider these aspects.



Priorities

In its current state there are many issues with the fabric of the building. It is important to set out the priorities for a system of works which will dictate costs and phasing. It is imperative that the building be made water tight and rainwater goods addressed and drainage fixed as a matter of urgency. Failure to address these issues could cause the unnecessary failure of any new work undertaken.

It is not recommended that the interior walls should be re-plastered and redecorated before the source of the moisture has been rectified and the walls allowed to dry out.

Roof

The roof must be assessed and repaired with special care taken in dealing with lead flashings at valleys and gables which have been allowing water ingress. The issue of the leaking gable coping stones has been seemingly addressed for the moment with a fibreglass capping along the West end gable. It is worth providing a high-level access crane to make sure all roof details are thoroughly checked and photographs taken to make sure the roof is now weather-tight. The lead flashings on the other side of the fibreglass cover should be checked to make sure they are adequate and not allowing water ingress.

The flow of water off the roof should be checked when it is raining to pinpoint problem areas. There is minimal overhang in places potentially resulting in rainwater flowing down the walls. Rainwater goods should be repaired / replaced where necessary ensuring gutters are of an appropriate gauge for the water run-off. Downpipes should allow free drainage into drains around the foot of the building.



Two dislodged downpipe connections which should be repaired/renewed.



Vents in the plinth should be opened up and maintained

Drainage

The drainage around the church should also be addressed. A land drain to take water away from the foot of the building should be considered.

Lowering ground levels around the building and providing land drains will dramatically reduce any issues with rising damp.

Note we do not recommend the use of any damp proof injection system. With a rubblestone wall injection cannot in practice achieve a complete, unbroken barrier and could exacerbate problems.

3. Observations and recommendations

Exterior Walls

The exposed stone is generally in good condition but some stones have fissures in which could be entry points for moisture. Much of the pointing is sound and perfectly serviceable in some areas lime survives and in others it has been replaced with impervious, brittle cement. There are areas of failed pointing and washed out pointing across the West end which require selective re-pointing.

The modern cement render is hard but brittle resulting in cracks opening up especially around windows. Cement render and synthetic masonry paints will not allow the effective release of any moisture which penetrates through cracks. This results in moisture building up within the core of the wall before it is finally pushed out / or is drawn out to the inside walls resulting in blowing plaster and paint and excessive salt migration.



An example where isolated repointing would be sensible – the areas with moss are obviously holding moisture. The cement should be raked out, the wall allowed to dry, then be repointed with Blaenavon aggregate and NHL3.5 lime at 3:1 aggregate to lime. The pointing should be done slightly proud of the surface then tamped back flush with a churn brush.



An example of a joint opening up which can allow moisture ingress even if the crack is only hairline. This should be raked out and repaired in lime mortar.



Small hairline fissures in the stones can potentially draw moisture through



It is important that the mortar fillet between the lead and coping is intact and not allowing water through – any damaged mortar fillets can be replaced with a well fibred sand and lime mix or in this protected location fine hemp plaster. The lead flashings should be checked to ensure they remain intact and are suitably installed and of the correct code.



Typical examples of cracks in the cement render – these need filling with silicate filler before the wall is painted with the silicate paint system.



The render should be patch repaired with Ecomortar C and fibre – and the crack filled with silicate filler before applying the silicate paint system.

Recommendations

Where pointing is sound and doing its job it should be retained.

Where re-pointing is required extreme care should be taken not to damage the stonework and plugging chisels or more effectively quirks should be used by hand – angle grinders and electric hammer chisels should **not** be used. If in doubt the pointing should be left in places where more damage would result from its removal. A minimal intervention approach is best with isolated pointing repair where needed.

The most appropriate material to use would be a 'blaenavon' NHL3.5 lime mortar to offer a similar colour match and some flexibility. The mortar should always be softer than the surrounding stone making it sacrificial to the stone. If undertaking work at this time of year a NHL3.5 hydraulic lime with 'blaenavon' aggregate should be used. Joints should be kept tight and the mortar sponged back to achieve a finish to blend in with the walls.

Washing / power washing is not advised. This would introduce too much water and could accelerate loss of fabric for little benefit.

With the cement render the long term solution would be to remove it, allow the walls to dry and re-render in an NHL3.5 lime render to be painted with a mineral silicate paint. However this is a significant scope of works which would take several months and be costly. If in the short to mid-term if you wish to protect the render and prevent further

water ingress then the cracks should be filled with silicate filler and then the whole wall coated with fixative, then 2 coats of quartz filler followed by two coats of accurately diluted beeckosil silicate mineral paint.

Interior

No interior re-plastering or decoration should be carried out before the issues with water ingress have been addressed and the walls allowed to dry out

The interior of the building shows the effects of water ingress, especially the west end. The plaster has failed in numerous places. Large areas have blown and salts are coming through. A vinyl emulsion has been painted on the walls and after trapping moisture within the walls it is now blistering and peeling. This will also allow lots of condensation to form on its surface during services.



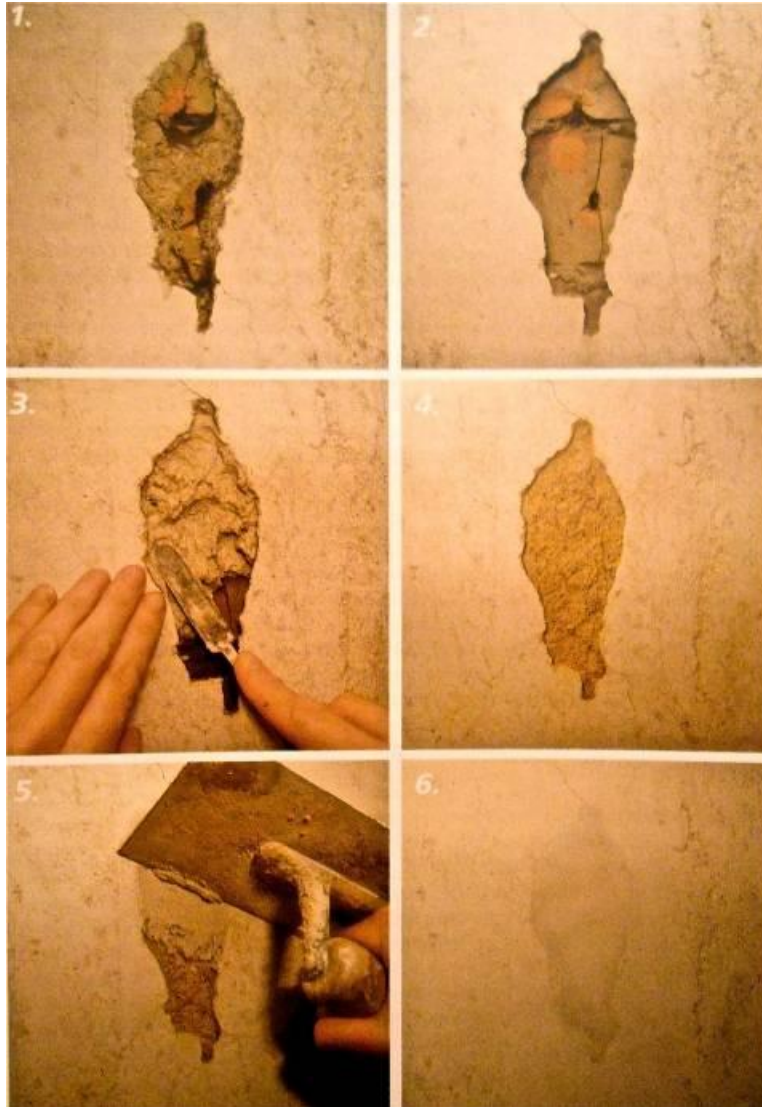
Walls should be allowed to dry before re-plastering. Care needs to be taken at the junction of new and old plaster

Recommendations

After the water ingress problem has been fixed, drainage addressed and the walls allowed to dry the walls can be re-plastered.

A 'standard' build up comprises two 9mm haired base coats and one 3mm fine finish top coat. New plaster could be thinner on walls and still be flat. If using hydraulic rather fat lime plaster we would recommend 'Ty-Mawr standard' aggregate for haired base coats and fat lime internal finish top coat. Hair can either be natural or synthetic added at a ratio of approximately 1.5kg per tonne of plaster. Patch repairs can be done in Ecomortar R50 providing the wall is dry.

If retaining areas of original plaster care must be taken with new plaster at the joints where the old plaster has been cut away. We recommend that at edges the old plaster should be slightly undercut to allow a good joint for the new plaster. There will be high levels of suction at the joints and they should be carefully wetted to minimize shrinkage and well finished working up to the cut edge. It is likely that the joint between the old and new plaster may show through. This can be disguised to an extent in the finish.



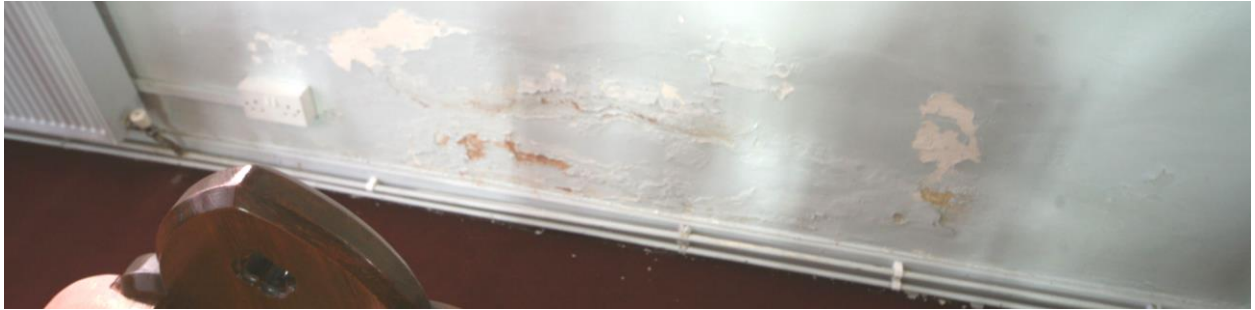
The sequence of a small patch repair.

1. The area to be patched, 2. The area is cleaned back to the substrate and the edges of the area to be repaired are slightly undercut using a sharp craft knife to help provide a key for the repair, 3. The area is thoroughly dampened and the lime plaster pressed onto the backing, the undercut edges are supported whilst plaster is pressed into the recess – if using a sand lime hair is necessary to reduce the risk of shrinkage, 4. The plaster is brought up to below the finished level, it is allowed to pick up, then keyed by scratching, 5. The base coat is dampened before a topcoat is applied flush to the surface and dampened to control drying, 6. The patched wall ready for painting

A breathable paint should be applied to the finished plaster. Limewash will not readily adhere to gypsum and old synthetic paint but will be fine on new lime plaster. For durability it is suggested that a pure mineral paint such as INSIL is used. It is as

breathable as a limewash but it has 4% artificial resin which helps it to bond on difficult surfaces e.g. where an old emulsion may have been used. This paint is therefore highly popular for the internal walls of churches that have had other paints on in the past but where you wish to maximise breathability.

Application of insil is best done by brush. Onto a clean dry background one coat of insil/maxil primer followed by one coat of insil paint. Onto areas where there have been salts apply 1 coat of silane primer before the insil paint. Apply the insil evenly and lap free, do entire areas in one go and do not cut in or you will get 'picture-framing'.



Typical areas of blowing paint and plaster due to a buildup of moisture and salt efflorescence due in most part to cracks in the external render. Heat within the church will draw moisture to the inside of the walls. Damaged areas should be removed back to sound dry plaster then allowed to dry before patch repairing. Volvox casein filler can be used for cracks before repainting is carried out.



Cracking of a thick layer of emulsion paint – modern emulsion contains acrylic which means the paint forms a ‘skin’ over the surface which can crack due to moisture being trapped behind, surface tension or temperature variation. This area should be scraped back before being re-painted with Insil. If the top surface has come off with the paint then areas can be patch repaired with EcoMortar R50



Water ingress on the west end, probably historic from the damaged coping stones (now covered with fibreglass) has built up under the plastic paint causing it to blow. Metal corner beads around the door have rusted and expanded causing further damage. It would be prudent to remove the rusty corner beads entirely if it is relatively straightforward or cut out rusted sections if not and patch repair and put back stainless steel or plastic beads.



Areas of blown plaster and plaster with salts in (shown by the white salt efflorescence clearly visible) should be removed. The wall allowed to dry and patch repaired with R50. Ultimately when the wall dries the salts should stop moving through the wall however this can be a long slow process. A silane primer can be applied before painting in insil. If the wall remains getting wet then ultimately salts will come through a silane primer. Do not wash off salts as they will just get reabsorbed into the wall instead dry brush and vacuum.



Salts clearly seen on this wall. Simply painting over in insil will not solve the problem and the insil will come off within a few months. Again here the rusting corner beads should be removed and replaced with stainless steel or plastic.



Salts coming through the wall and bubbling off the synthetic emulsion paint which is holding it back. This area should be removed and the wall allowed to dry before patch plastering.

Summary

- Replace defective lead flashings and damaged or slipped slates,
- improve the weatherproofing on the gables by checking the mortar fillets and lead flashing,
- replace / repair rainwater goods for the future protection of the building,
- installation of land drains around foot of building
- external re-pointing only where necessary,
- isolated stone replacement / repair / plaster repairs
- only when it has been satisfied that the problem of moisture ingress has been solved and the walls allowed to dry out should they be re-plastered and re-painted with a breathable mineral paint

Attachments

- hydraulic lime mortar and fat lime mortar fact sheet
- fat lime plaster guide
- Lithomex repair mortar
- EcoMortar R50 guide
- Volvox casein filler
- Volvox isolating primer
- mineral paint technical sheet

The information provided in this report is provided in good faith after an initial visit. It is suggested that you satisfy yourself with the technical characteristics of the product for the specific applications (see published technical sheets – copies available on www.lime.org.uk) and if necessary ask the contractor to produce samples so that the suitability, timescales and finish of the house can be finalised. Ty-Mawr Lime Ltd are committed to providing the highest level of support to ensure a successful job, if you have any concerns at any stage of the project, please call us for advice.