The Building Limes Forum Ireland Newsletter

Comments and articles in this newsletter do not necessarily reflect the views of the Committee or the Editor

Kilbarron Castle, Co. Donegal – needing a little work.

Editorial

Welcome to our November 2014 edition of the Building Limes Forum Ireland Newsletter. We hope everyone has had a great year and is looking forward to the festive season.

Each year the BLFI commits to improving our understanding of building limes and 'spreading the word'. 2014 is no different. In fact, never before has there been more interest in lime, in all its guises. If you are reading this at our hot-lime workshop in Drimnagh on the 25th November, or at the subsequent AGM, you will already appreciate the significant interest there is in re-introducing quicklime and hotlime mortars in Ireland. There will be plenty of debate and discussion around this subject, not just on this day, but for some time to come.

That is the primary benefit of being a member of our Forum. You get involved, you enter the debate and you contribute to the ultimate goals of improving the lifespan and function of our built heritage.

There are so many people who warrant mention for organising events this year, giving freely of our most precious resource; time. Too many in fact for these pages, but a special thank-you this year needs to go to Kevin Blackwood, our Chairman; Lisa Edden for all her energy and enthusiasm down in Russborough and Pat McAfee, Yvonne Doyle and Ivor McElveen for driving the HLM project and its related events. A special mention must go to Ivor for really pushing this project to the top of the BLFI agenda and bringing it to a much larger audience.

We hope you are getting the full benefit of being a member of the BLFI and we welcome any suggestions to make it work better for you.

Don't forget, wrap up well this winter!

Thanks to all of you who contributed to this Newsletter. We very much appreciate you taking some time out of your busy schedules.

Hugh Dorrian
BLFI Newsletter Editor

****

The Building Limes Forum Ireland Newsletter

Comments and articles in this newsletter do not necessarily reflect the views of the Committee or the Editor

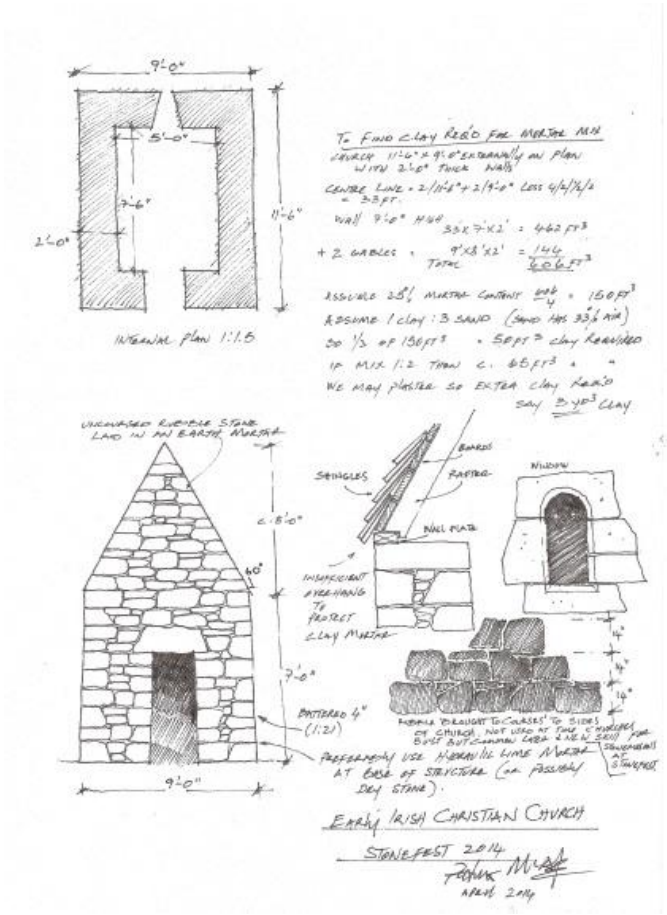
Cementless in Seattle: Working with Soft Clay Mortars and Hard Granite Stone 2014

by Patrick McAfee

This year an opportunity arose for me to work with a clay:sand:quicklime mortar at Stonefest, an annual event held at Marenakos Stone, Preston, Seattle, Washington state in the USA .

Stonefest is an annual gathering of anyone interested in stone. It particularly caters for stonemasons, dry stone wallers, sculptors, carvers and letter cutters and is a combination of practical work and talks. I've attended as an instructor since 2006. The northwest is not particularly noted for its use of stone, being historically a culture of timber combined with a strong Scandanavian influence. When Seattle burnt down in the late 19th century it was re-built in masonry materials one of which is an excellent local dimension stone called Tenino sandstone.

Stonefest is five days in duration and for 2014 I decided to build an early Irish Christian church, essentially a folly. I chose the cheapest stone in the rock yard, a hard granite rubble to be used in combination with a soft mortar composed of clay, sand and quicklime. The participants had probably only ever worked with cement mortars and most had probably never built solid walls before so there was going to be a learning curve.
It would be a small church, rectangular in plan with its sides at a ratio of 1:1.5 having two gables at steep sixty degree pitches, a round headed, single light window, a door, it's walls plumb internally and battered externally, more so on its longer sides than its gables.



Drawing of little early Irish Christian church by Pat McAfee

The granite rubble was plentiful and selected to have a face so that there was little or no cutting. The clay for the mortar came from nearby Whidby Island in waste disposal bins which we thoroughly soaked in water. The quicklime granules were collected from nearby Tacoma.

Batching wet clay from a skip in to a bucket

Clays vary, some have little clay as such, others have more. Some in turn have too much silt and may have little or no sand.

Clays have to be tested and often other materials like sand have to be added before they can be used.

Arriving a few days early at Stonefest in order to set up I was offered assistance by two Irish dry stone wallers who were sponsored by Stonefest to attend this year to build a dry stone wall project; these were Ken Curran and Ruairi Noone. A third sponsored Irish dry stone waller was Sunny Weiler, who arrived later.

A quantity of clay from one of the bins was knocked up and part of it used to plaster a small panel on a concrete block wall. Then other panels were created with a mix of 1 clay:1 sand, 1:2 and 1:3. These are shown in a horizontal line at the top of the accompanying photo.

Then 10% quicklime was added to the clay:sand mixes of 1:1. 1:2 and 1:3
Lastly 5% quicklime was added to the same ratios of clay:sand as before.

Test panels showing various samples of clay, clay and sand and clay, sand and quicklime mixes

Within 24 hours the clay only mix had severely cracked; the two mixes showing no cracks were the 1:3 clay and sand followed by the same mix with the addition of 5% quicklime. The 1:3 mix with 10% quicklime showed minor cracking. I decided to go with just over 5% quicklime in the mix and this worked out at 6.7% because it was what the small plastic container used for batching the quicklime measured.

This method described of testing clay mixes is rather primitive and there are other additional field tests that can be used.

Small ratios of quicklime can have extraordinary effects on clay. BLF's well-known Stafford Holmes is having great success in Pakistan with clay:quicklime mixes to repair mud built houses and resist flooding. He has developed a whole series of tests that take in to account variation in clay types in different villages.

Clogrennane lime provides quicklime as 'Clayfix' stating: 'The lime reacts with soil silicates and aluminates to form a stable base for construction.' What is amazing about this is that non-hydraulic lime mixed with soft mud hardens and stays hardened even when it subsequently rains.

Our vernacular clay mortars often display small quantities of quicklime inclusions. It made sense to add quicklime in order to generate low level heat to stiffen up over- wet clay, make it usable as a mortar and generate evaporation resulting in hardening so that work could progress, but was there a realisation that a more long term effect was occurring? It doesn't take much imagination to see how clay/quicklime mortars could have a future in green build.

Anyway, back to Stonefest; we had found our workable clay:sand:quicklime mortar.

The mix decided on-showing 3 parts sand: 1 part clay and 6.7% quicklime

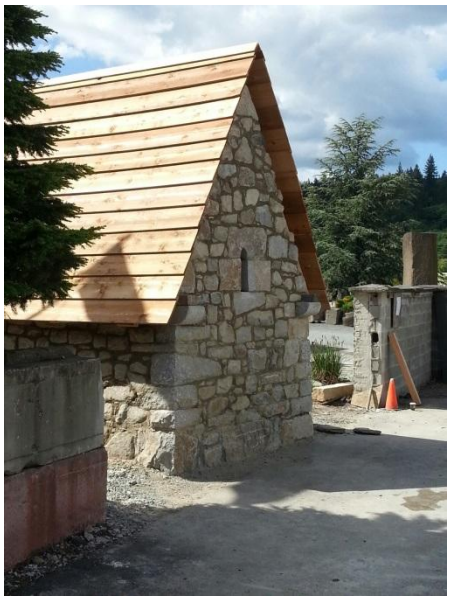
A standard cement mixer was used. The small amount of quicklime in the mix produced a warm rather than a hot mortar. Safety glasses were compulsory while mixing. The weather was sunny and warm and so everything was drying fast; the mortar therefore was mixed a little over-wet which was just right by the time it got to the mortar boards. Basically those laying stones got their stones ready in advance of the mortar arriving so that they could use it while it was still warm, and spreadable and before it stiffened. I made sure that the mortar kept coming so that the stonemasons were always working.

A single light window in granite ready to install.

The work begins

There was no problems in building granite in a clay mortar, no slump, runs down the face of the work, squeeze out, swimming stones etc. The clay mortar adhered well to the granite, rarely had mortar to be applied more than once to a vertical perpend of a stone. In a short while the stonemasons had forgotten what they were working with and the only comments were that they liked using it. In this way it is akin to working with hot lime mortars.

Stonemasons working at the west doorway



A temporary cedar boarded roof

We went a few minutes over the five day schedule with the last stones laid on the apex of the gables. A lot was learnt, it was worthwhile doing, the response was positive.

Stonefest is organised by two inspirational people: Scott Hackney, co- director of Marenakos Stone, Seattle and Alexandra Morosco,stone sculptor. www.stonefest.org

****

Government supports the HLM Project

HOT LIME MORTARS & RENDERS

Progress Report November 2014

The Department of Arts, Heritage and the Gaeltacht have made a grant under the Government Policy on Architecture 2009-2015 scheme to the HLM Project which has now been further supported by the Heritage Council under the REPS4 Traditional Farm Buildings Grant Scheme, being sponsors of the Workshop held at Drimnagh Castle on the 25th November.

On the 6th November the BLF Committee (UK) passed a resolution to form a Special HLM Project Committee to approach English Heritage, Historic Scotland and CADW (Wales) with a view to participation.

The HLM Project is a response to the endeavour of the Building Limes Forum Ireland to commission a technology transfer and applied research project on hot lime mortars and renders from Scotland to Ireland. In conjunction with Clogrennane Lime a subsidiary of Cement Roadstone Holdings (CRH) and the Office of Public Works (OPW) the BLFI is undertaking applied research for the gathering of technical information on hot-lime mortars and related for their preparation and applications.

Essentially the project entails transfer technology from Scotland, customised to Irish conditions with the comparative testing of materials. Research and testing is taking place at the OPW facilities in Athenry, Co Galway and Portumna Co Tipperary. The HLM Project is being accomplished under the auspices of the BLFI where its Technical & Standards Committee plays a consultative role. The output will be the production of suitable technical literature for the production of specifications with methodologies on the preparation and application of hot-lime mortars and renders in an Irish context. Good practice with Health & Safety statements is being provided. There will be provision for publicising general information and promotional literature on the use and application of hot-lime mortars and renders specifically designed for the specifier and practitioner.

Emphasis will be more on empirical practice of the craftsman mason and plasterer than academic, and the output will lean towards the practical.

In the recently published *Building Limes in Conservation* (Ian Brocklebank, The Building Limes Forum, Donhead 2012) the introductory paragraph of an article by Dr. Alan Forster, *Hot-Lime Mortars a Current Perspective*, he states; ‘hot-lime mortars are again being used and are perceived to have advantages over cold manufactured mortars. Little is understood, however, regarding the physical and chemical performance of hot-lime mortars’. This is despite their successful use since Roman times and indeed earlier.

There is a need for a greater understanding of the characteristics and performance of hot lime mortars and renders for use in the conservation and repair of historic masonry structures, and also for good practice and practical advice in their application.

The activities and output of the HLM project will be:-

i. Evaluation of the suitability of hot-lime mortars and renders for use in the consolidation and repair of Ireland’s traditional buildings, monuments and ruins.

ii. Characterise the performance of a range of hot-lime mortar and render mixes using commercially available Irish quicklime, Irish sourced aggregates, NHLs and pozzolanic materials.
iii. Information for the production of suitable technical literature and good practice giving guidance on the design, preparation and use of hot-lime mortars and renders complete with specifications and methodologies, including aftercare as well as Health & Safety.
iv. To conduct practical field trials which can be subsequently monitored to assess long term performance.

The initial mixes were:-

1:4 Quicklime : Sand
1:4 Quicklime : Sand + 10% crushed oyster shell
1:1:6 Quicklime :NHL 3.5 : Sand

Test being carried for Phase 1 examine soundness at 28 days, 90 days, 6 months & 1year by measuring:-

Flexure
Compression
Density
Absorption
Porosity
Rate of Carbonation

Separately, various masons are now using a variety of hot-lime mixes with considerable success and testimonials are being submitted.

The Final report of Phase I will be issued early 2015

For more information please contact:-Yvonne Doyle, Hon Sec BLFI – HLM Project Technical & Standards Commitee

Tel: 053-9255977

Email: yvonne@ivormcelveenassociates.ie

****

Analysis of modern repair mortars - some traps and pitfalls.

By Lisa Edden

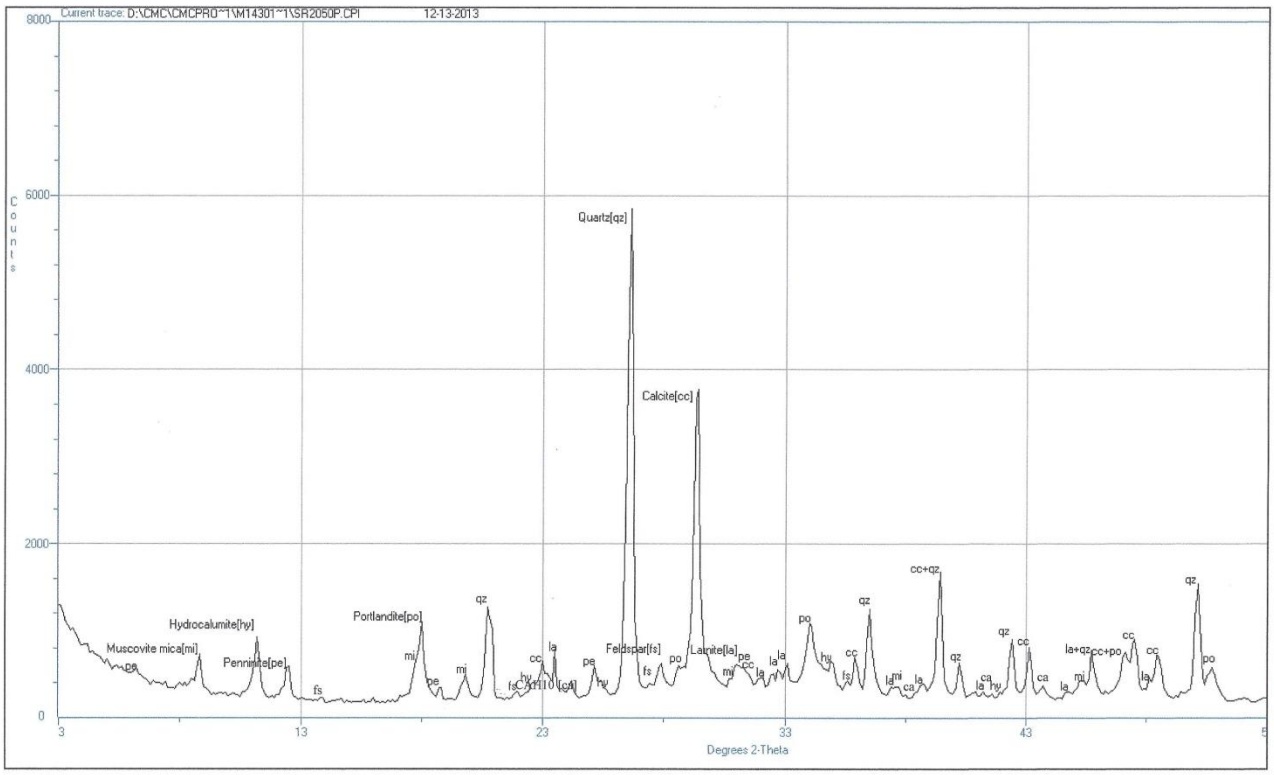
This last year saw the request for testing of recently placed mortars, on two buildings, because there was some doubt as to the binder type used. The mortars appeared hard and grey. The two projects are quite dissimilar to each other. They are either side of the country, with one it was the pointing and the other the render that were being investigated. There were different design teams and contractors on both and different investigating teams. The similarities however are that the teams investigating were not the original team charged with the design and overseeing the placement of the mortars and also that in both instances the early test indications were that a Portland Cement binder had been used. However in both instances the veracity of the tests was questioned and further investigation showed that predominantly a hydraulic lime binder had been used.

Confirming the binder type in the mortars was crucial to resolving the queries raised and allowing the projects to move forward / find resolution. What was not at first anticipated was the difficulty in determining the binder particularly a hydraulic lime and the intermediate queries that developed. The time it took for tests to be carried out also presented programme issues.

Case 1

Pointing mortar in a squared random rubble wall of Millstone grit, exposed coastal hill top.

The concern here was that the issues with water ingress through the stonework had been exacerbated by an inappropriate re-pointing contract five years previously.



A single sample was sent off to the lab and a mortar analysis called for to determine binder and mix proportions. The mortar was described as "*well compacted, dense and hard and displayed properties consistent with a cement based material….. a representative sub-sample was prepared and submitted to analysis by the methods of BS4551:2005"*

The Mortar was classified as a type ii 1.0 Portland Cement: 0.4 lime : 4.0 sand

When the results came back the investigating team were somewhat doubtful and more information on the supply chain from when the mortar was placed 5 years previously was available including the make and type of binder used. The results were queried and the lab then carried further tests.

A sample was finely ground and then the finest particles passing a 63µm sieve were collected for X-Ray Powder Diffraction (XRD) analysis.

"On the basis of the results from the XRD analysis on the mortar sample submitted it is indicated that the lime used in the production of the mortar was a moderately hydraulic lime. The absence of Alite (Ca_3SiO_5 – Calcium tri-silicate) would confirm that no Portland cement clinker is present and that it is also unlikely to be a NHL5 grade binder. No evidence of the presence of the most common Portland cement hydrates were detected in the sample analysed."

The lab also sent this summary paragraph in an email:-

"We have retested the material and carried out an XRD to confirm the material content.

The initial testing of BS4551 was carried out as we were led to believe it was a cement mortar. Thanks to your additional

information we have been able to confirm that the material used was indeed a NHL 3.5.

The material as received was fully uncarbonated, this could be caused by overworking the surface finish or poor curing/protection."

So in summation it would seem that a poor sand selection was made, the time of year and method of mortar application were poor and there was no curing procedure.

This has led to a poor performance of the pointing and the suspicion that the incorrect binder was used. Given the era (2009), the exposed location and stone type the NHL3.5 binder specified and actually used can be considered best practice.

An XRD analysis should have been called for and instigated by the investigating team from the outset. This would have proved that the correct binder was used (** But take care – see Case 2 **) and the other matters could have been homed in on earlier.

Case 2

Internal lime plaster to brick party (with chimneys) and exterior walls, inner city location.

The query here was generated by the building owner who was concerned that Portland Cement had been used instead of the NHL3.5 binder specified and thus breathability of the walls would be affected.

Four samples were taken initially; just two were tested by XRD. The report states:-

"Sample 1 has a binder that was predominantly Portland cement contaminated with a sulphate mineral such as gypsum which can be found in artificial hydraulic lime but not natural hydraulic lime. Samples 2 and 3 are identical under the microscope.
Sample 4 has a binder that is consistent with NHL."

A second set of four samples were sent taken from different locations. They were first checked under a microscope and again they were said to match the cement sample from the original set of samples. However, after three of these were analysed using XRD they were all found to contain a Naturally Hydraulic Lime binder. The report states:-

"Interpretation

The bulk of the calcite will be from the binder, which is therefore entirely consistent with a Natural Hydraulic Lime precursor. Quartz is likely to be the major component of the aggregate; dolomite, possibly some calcite, feldspars (orthoclase and albite) and platy minerals (muscovite and clinochlore) are likely to be minor components of the aggregate.

It should be noted that no portlandite, larnite (= belite), ettringite and hydrocalumite were identified in the new samples. All of these phases were present in Sample 1 of the previous report. While the only phase that would <u>not</u> be expected in a binder resulting from the use of NHL 3.5 is ettringite ($((CaO)_3(Al_2O_3)(CaSO_4)_3.32H_2O)$), it seems likely that the portlandite, larnite (= belite), and hydrocalumite were also the products of the use of Portland cement.

Conclusions

All the new samples are mineralogically consistent with a binder formed from Natural Hydraulic Lime."

This process of two sets of analysis took from March to August during which time works on site were stopped.

It is thought that the one sample that indicated a Portland Cement binder may have been contaminated by repair works to the brickwork of the chimneys that had been carried out using a Portland Cement mortar and /or the initial application of a cement based scud coat.

The interpretation of the results appears to be an issue here. The first report stated that it was cement but on reading it closely it states that

the only element that could not also be found in a naturally Hydraulic Lime mix is ettringite but that this could be present in an artificial Hydraulic Lime.

Comparing the cases it would seem clear that getting the right contractor and making sure all know what is specified where is crucial to a project as well as minding the mortar once it is placed.

If we are testing then we need to be quite clear as to where samples came from and what we are looking to prove when sending the samples off to the lab.

I wonder also, if we have this proliferation of materials to pick from including all the Hydraulic Limes (HL's that may contain some of these other elements), whether we're never going to be certain of the constituent parts of a mortar after the event.

Maybe we should be taking samples cores and testing for porosity and permeability rather than constituent parts – would these tests answer our queries better?

****

Swimming Stones
By Pat McAfee

There is a limestone quarry in County Kerry in South West of Ireland near the village of Lixnaw which in Gaelic is Leac Snámha meaning the swimming flag or stone. I had the pleasure in recent times of running a workshop there in the techniques of traditional stone walling and lime mortars.

Swimming stones is an expression I have come across before in the course of building stone walls. We normally do not associate swimming and stone as having any relationship with each other unless it refers to the level of proficiency a particular swimmer might possess. However, we are not talking here about potential Olympic champions but rather stones in newly built walls that like to swim about a bit.

In Ireland we don't have to be told that it rains nearly every day in winter, also spring, summer and autumn. And when it isn't raining it is often quite damp. Problems occur when building mortared walls with wet stones, after a while the stones at the lower levels begin to swim about. This can be ignored for a while and progress can be made by laying more stones overhead, but not for long. The swimming stones develop from a mere dog paddle to a full-blown Australian crawl. At this stage usually attempts are made to push these lower swimming stones back into place, but they won't have a bar of it, all that happens is that they begin to achieve greater versatility in their new found freedom. You see they like to swim once they start and there is no stopping them. Prayers are often said at this stage such as 'please don't fall down just for my sake' but no, they are not going to accept this pathetic grovelling for one minute. Anyone who was stupid enough to lay them in the first place must suffer the consequences. There is unbelievable guilt in building stone walls, sometimes your mistakes instead of taking centuries to manifest themselves, when you are safely gone and forgotten, suddenly confront you head on. You always recognise the stone that starts to move first, the slightly unbalanced one, or the one not quite as thick on the top as its base, in particular the one not bedded with its longest length into the wall. It comes back to you in a flash, you knew it was a trouble maker from the start, but for expediency or laziness or whatever you chanced it and hoped for the best. You cannot fool the stones, they have been around a lot longer than you have. Most of us who build mortared stone walls experience this (less so, hopefully as we get older). It is both embarrassing and costly because the only answer is to take the work back down and start again. If we don't do this, by pretending it doesn't exist then we may have to jump very quickly to get out of the way or be entombed within our mistake. I can hear you say that we should not work with wet stones, and didn't stonemasons in the past stop working between late Autumn and early Spring anyway and return to the warmth of their homes like any sensible person would do in a cold damp climate. Possibly the

swimming stones know this better than we do and are trying to jump out of the wall and get there ahead of us, I don't know.

We know that wet stones contribute to swimming but so do modern mortar mixes based on sand and cement, they are unworkable if stiff and shed water too readily if wet, carrying cement down the face of the work and staining. They also create other problems I won't go into here. Dry, stiff mortars are part of the answer but they are very hard work on the wrists.

All of this is overcome by using a mortar as old as time its self, namely a hot lime mortar. Hot lime mortar is made by mixing quicklime and sand (usually coarse sand for rubble work) together with water , the result is a thermic reaction within the sand from the quicklime and quite high temperatures (Note: this is a dangerous procedure which requires training and safety precautions before attempting).

It is generally thought and accepted that it is best practice to allow this material to sour out ,an Irish expression meaning to lie in wet state under cover,(the lime and sand, that is) for a period of months before use, but was this always done in the past? I think not. It is possible to mix and use this mortar while still hot and in a plastic state so that it will spread easily. The stone is laid and in a matter of a very short time with evaporation from the heat, the mortar naturally stiffens and those wet damp stones find it much harder to start their devilish movements. A rather primitive mortar most would agree but an exceptional one to use as it readily sticks to everything including vertical stone surfaces, a crucial element in the proper jointing of stones.

Traditional stone walls were solid and generally varied from 2 feet in thickness upwards. With non-hydraulic lime mortar mixes and thick walls, evaporation of water from the mix was more important than carbonation.

Evaporation causes stiffening of the mortar, thereby reducing the tendency of stones to swim and allowing work to proceed vertically. Carbonation is a rather slow process requiring access by air (difficult in the centre of thick walls). It is more crucial that effective carbonation occurs in mortars near the face of the wall to prevent washing out by rain than in their centres.

To have hot lime mortars available, lime kilns would have to supply quicklime, not exactly on a daily basis but at least once a week because the quicklime will air-slake and become useless if exposed to the air for extended periods of time.

What better than a hot lime mix to create evaporation and therefore stiffening. Also how pleasant it must be for the stonemason to feel the warmth of the mortar on a cold damp day.

First published in an article for 'Traditional Masonry' Magazine, USA on hot lime mortars in 1999.
– Pat McAfee

****

Letter from Sean Brogan,Tir Conaill Conservation

Dear SirsFurther to recent findings on a project we are currently working on in Co Donegal we would like to highlight the following. Our contract involves the hacking out and repointing stonework on a building that dates back to the late 1700s.

I was dismayed and disappointed at discovering that previous "craftsmen" around twenty years ago had carried out similar work but with no obvious care or attention. They had cut out the lime mortar joints with a small angle grinder and in doing so cut into the surrounding stone.

Whilst that wasn't bad enough the joints were then re-pointed in cement mortar instead of lime mortar.

Such findings begs a number of questions.

1)Where was the supervision of the Design Team? Was the work carried out as per the specifications? Was the Design Team experienced in the design/specification/ construction of conservation work?

2) Was the job priced to low which resulted in the use of fast but inaccurate electrical tools instead of the slower but accurate chisel and hammer method?

3) Was the contractor experienced in conservation work or was he a traditional builder who was running short of work and tried something new?

4) Were subcontractors contracted in to carry out this specialised work that the main contractor was not experienced in?

There are many questions but nobody involved thought of the past or the future.

If we reflect on the past we would consider the people who worked long hours in quarries breaking out the stone, carting them by hand or barrow to a loading point, getting the stone transported to the site many miles away, loading them and hoisting them on some type of scaffolding, These people were poor, had little or no basic facilities at home, had to walk to work maybe many miles from their home, probably up the side of a hill somewhere in rough terrain, in all seasons, probably had no shoes, bread and water was their lunch, they had no face protection, power tools - everything was by crowbar and hammer, no gloves, all physical work. The stone had to be perfect or they would probably be penalised with no pay.

On site the stone mason was a perfectionist and had pride in his work. Each stone was considered carefully and handled a number of times. The lime mortar was also mixed to perfection. Again all this work was carried out in basic conditions - what type of scaffolding had they? There were no gloves to protect their hands from the lime. These people had pride in their work and it was well supervised and buildings have lasted centuries because of this. These historic buildings are part of the landscape and are known all over the world for their extreme beauty. The person who butchered the stone with an angle grinder had no consideration for the past.

In considering the future, what was the thought process of removing lime mortar and replacing it with cement mortar? It seems that all of the parties involved did not know the properties of lime and its applications. The result of this is that this work has now to be redone as dampness was penetrating the building within twenty years. With the previous original lime pointing it lasted over two hundred years. We also discovered at high level that previous workmen on the roof in the late 1960 had chiselled their initials in to the stone in two different locations.

This too is disappointing when you consider that the men who built the building in the late 1700 and took them many years to build it did

not leave such an unnatural mark on any stone in the building.

I would hope that by highlighting this one situation that conservation work would in the future be carried out to proper standards and this includes the awarding of works to competent experienced design teams and experienced contractors who have the knowledge and expertise in conservation and restoration of buildings from our past. We must always reflect in the definition of conservation before we embark on these historic buildings. The work is slow and tedious, materials are specialist and often hard to get, good workmen are priceless so therefore cost of the project should not always be high on the list of priorities.

- **Sean Brogan, September 2014**

Sean Brogan, a true Donegal football supporter, keeping the flags flying into September for another year.

Work complete at Dunlewy, Co Donegal

****

BLF 'Gathering', Dublin, 2013

By Dr. Gerard Lynch

At the BLF 'Gathering' in Dublin, Ireland, September this year,
Was plenty of learning, alongside the world-famed Irish good cheer.

Our grand, historic, venue - the 'Dining Room' inside 'The King's Inn',
Where three days of presentations were eloquently delivered in.

Such wide and varied subjects, for the many delegates to pick,
Sustainability, various limes and mortars: and use of a 'Hot Mix.

How the efficacy of Lime-Hemp Concrete, this could really become big,
And why not to re-point with 'Tuck', if the original joint-finish was 'Wig'.

And those whose love of making quicklime, by 'calcination', was yearning,
Could go to Russborough and help repair a kiln: and then the lime-burning.

Throughout there was dry weather, in fact it was sunny and very hot,
So the outdoor 'Lime Fair', and local tours in Dublin, all attracted quite a lot.

The evening entertainments, well these were always a winner,
And then the 'Dining Room' at 'The King's Inn', for the final BLF dinner.

So well done BLFI, you really pulled it off, and were indeed a wonderful host,
And all at 'The Gathering', I'm sure would join me, and raise a glass to that toast

Dr. Gerard Lynch, September, 2013
****

'While not exactly a like-with-like it is an honest repair – it is reversible and it works!, So says Ivor McElveen who came across this unorthodox rainwater pipe socket on Main Street, Clifden, Co Galway.
****

Paediatric outpatients' centre annexed to Our Lady of Lourdes Hospital in Drogheda for the Cystic Fibrosis Association of Ireland – by Manfredi Anello, Architect.

Cystic Fibrosis (CF) is Ireland's most common genetically inherited disease. With over 1100 CF Patients, Ireland has the highest proportion of CF sufferers in the world.
CF Ireland was established by a small dedicated group of parents in 1963. In 2010, the Drogheda branch of CFAI purchased a small terraced bungalow beside the grounds of Our Lady of Lourdes Hospital with the intention of establishing a dedicated outpatients' Centre. Essential to CF treatment therapies is in fact isolation from other sufferers and eliminating cross-contamination with other hospital patients.

Description of the unit
The project entails the conversion of a small bungalow within a terraced residential area directly bordering the hospital into a treatment room, and the careful insertion of 2 additional treatment rooms or "pods" in the rear garden.
Entering from the hospital car park, the young patients may spend up to 3 hours in a room during treatment, so the shape and spacing of the pods forming the clinic is designed to bring as much playfulness and light as

possible to the internal spaces, ensuring stringent medical standards.

The sensitive nature of this highly specialised unit sets new standards for CF Outpatients' Care in Europe. Given the very limited space available and the proximity with the hospital, CFAI has adopted the model of practice where "care comes to the patient". Rather than exposing CF sufferers to potential contamination, the patient awaits the arrival of various health professionals in the room, who conduct their examinations and carry out the necessary therapies.

The three treatment rooms are spaced by small landscaped courtyards, overlooked through frameless and partially frosted windows. The two pods in the rear garden soar higher than the corridor which links all rooms. This extra height increases the brightness and light levels inside, culminating in a central rooflight. The corridor is also punctuated by deep rooflights making it a bright and airy place.

Materials

A unique elongated and thin brick with recessed pointing , reminiscent of Jenga blocks or Lego, clads the new construction. These hand made bricks, 440mm long and 50mm thin are Liner Parham Red Stock produced by Ibstock 1 . The 20mm deep lime pointing in NHL 3.5, reinforces the crafty brick work by adding a "chiaroscuro" effect, and a playful texture to the façades and courtyards. NHL 5 has been used to allow sufficient waterproofing on the parapets and in the flaunched joint between the staggered bricks of the "seam" on the front façade. Light hued lime mortar was chosen for the contrast to the brick and also for its material qualities, as the material will gracefully change colour in time and with the seasons. Its flexibility avoids the need for expansion joints, keeping the façade continuous, and its environmental performance allows for better recyclability and building life cycle. During its life time and what is known as "the lime Cycle", the mortar will release oxygen into the atmosphere, a humble but significant material contribution to a building in which cleanliness of the air is so important. Behind the brickwork is a full-fill cavity air tight blockwork construction. All windows are thermally broken proprietary aluminium with near-frameless double glazing and a small openable panel at the bottom. There is an angled window on the entrance facade facing the hospital, allowing for privacy to the first treatment room. Here the brick seam is expressed with a knuckle staggered joint.

One single cherry tree stands to complete the symmetry and purity of the composition within the front yard and each courtyard, all three yards are covered in hued pea-gravel.

Technical

Air changes are comparable with the requirements of medical theatres and a purge program after each use guarantees the minimisation of infection within rooms. To ensure the highest quality of performance, the new Airmanager2 system, "proved to be effective in the destruction of even the most deadly of viruses, and effective to a virucidal level of Log 10 on a single pass and Log 12 after repeated passes" has been kindly donated by its inventor, David Hallam and has been installed in each room and in the corridor. Due of the sensitive residential location and tightness of the site, the two state of the art HEPA filtering systems comprising the mechanical plant are very inventively tucked away within the attic of the house. Only minimal external venting is visible to respect neighbouring residences, while an intricate system supplies the rooms with clean fresh air through ducting in the ceiling space of the corridor.

Team

-Clients, CFAI and CFAI Louth/Meath branches with fit out costs, staffing and running costs going forward provided by Our Lady of Lourdes Hospital Drogheda and the HSE.

-Architects:

Anello Architects - Manfredi Anello
Principal and designer, Mark Kelly, Carolin Aulenbacher Assistant architects.
-Mechanical Engineers:
Declan Keane Consulting Engineers.
-Structural Engineers:
David Maher and Associates.
Main Contractor:
-Doohamlet Construction.
This project was developed in its entirety through BIM on Vectorworks

****

Russborough Kiln
-Lisa Edden

The Russborough model would appear to be ever successful.

The advantage of working on a real ruin / building is that the challenges of not only the original construction can be understood but the intricacies of how to repair an actual building.

This year's workshop at Russborough ran from 14th -17th July and was put on in conjunction with the Society for the Protection of Ancient Buildings (SPAB) fellowship and Scholarship. Eoin Madigan stone mason from Co. Clare was the instigator of this conjunction having been on all of the previous workshops at Russborough and currently a SPAB fellow.

As before the workshop started with a Health and Safety talk each morning (thanks to Yvonne Doyle) in the amenable surrounds of the West Wing over a cup of coffee. Then to the workface with Pat McAfee fronting up the practicalities and our regular UK visitor Stafford Holmes on hand to point us in the right direction on the repairs. This July we concentrated on daubing out the pot with clays dug from Russborough, setting cobbles in the same clay and pointing with a hydraulic lime. And because we just can't stop ourselves - mixing up some quick lime and sand and making a hot mix to continue with some wall building and pointing in the lower draw area of the Kiln.

Each day finished with either a site visit to the local Granite Quarries in Ballyknockan or talks by one of the team. Pat McAfee gave a most inspirational talk in honour William Morris and SPAB "Journeys and Journals" with references to Georg Muller; Ruskin; Wilkinson; etc and even a glimpse of some of Pat's own sketches – truly wonderful.

The Building Limes Forum Ireland Newsletter

Comments and articles in this newsletter do not necessarily reflect the views of the Committee or the Editor

Smoke!

Stafford Holmes updated us on the key work that he and others are carrying out in Pakistan in lime stabilisation of clay / earth buildings. A practical solution to a calamity that can be carried out by the building owners themselves using traditional, locally sourced materials with scientific testing and monitoring. A model for us all to strive for.

Further works were carried out in September when Kirwan Masonry Services Ltd. provided a day of stonemasonry and labour to help complete the south draw wall – again all using Hot Lime Mortars.

We can now say the repairs we set out to do are Practically Complete.
That however will; not serve as an excuse to stop meeting there …. watch this space!

-Lisa Edden.

****

Building Limes Forum (UK) Technical queries 2014

14.11. Building Control Office and the use of lime

Query Northampton senior BCO insists that no lime should be used in any mortar in a double skin brick/block new build wall. He talks about 'problems later' and differential expansion. He says lime mortars are unsuitable for block inner leaves and therefore for outer skin because of differential construction. He argues he won't 'pass' lime mortar mixes in these walls because of 'Building Regs'

I have sent him technical papers from Hansen who at least talk of the advantage of lime/sand/cement mixes. Any comments please on this restriction on lime in new build?

Answer The technical panel of the Building Limes Forum is perturbed that Northampton Building Control will not accept lime mortars for us in the internal blockwork skins of cavity walls.

There has been a lot of work undertaken on the properties of lime mortars over the lasts 20 years. There is nothing in this research or the practical experience of using lime mortars in new build sites which suggests that lime mortar performs less well than comment mortar in block walls.

The first building which used lime mortars in the load-bearing cavity wall recently was the new office at RSPB in Sandy. This was constructed in two phases with the first phase built circa 1995. The mortar mix for the first phase was 1 part NHL 3.5 : 2 parts CL90 : 8 parts Leighton Buzzard sand graded 4mm down. There is no sign of any distress with this mix and it continues to perform well. This mix could be considered a hybrid mix of hydraulic and non-hydraulic limes. Hybrid mixes were questioned by English Heritage as they were concerned about the strength of the mortar might be reduced. With time strength is not an issue and indeed a weak but durable

mortar is what should be aimed for in all but panel wall construction. (EH have now withdrawn their reservations).

The second phase of RSPB was undertaken circa 2005 and used a mortar mix of 1 part NHL 3.5 to 2.25 parts Leighton Buzzard sand. Again the mortar has performed well with no signs of any distress. Since the RSPB projects there have been numerous examples where lime mortars have been successfully used with block walls.

The research undertaken by Bristol and Bath Universities led first to the publication Hydraulic Lime Mortar for Stone, Brick and Block Masonry" and then to NHBC Foundation producing the booklet. "The use of lime based mortars in new build". Part of this document was a Development Standard for "The Structural use of unreinforced masonry made with natural hydraulic lime mortars – technical annex for us with BS5628 – 1: 2005". This document is a good starting point for designing new masonry walls but the research published in 1911 by Dibdin both confirms the results and adds to the information on it.

Recent research has also demonstrated that the thermal expansion of Lime and cement based mortars is very similar. The advantage of the lime base mortars is that their weak tensile strength results in micro cracking where the free lime re seals less the crack. In cement mortar the cracking occurs at less frequent centres and so the crack width increases. In addition there is no free lime to re seal the crack. The size of concrete blocks is no larger than the size of stone blocks, where lime mortar has been used for thousands of years. The thermal movement in an internal block is therefore unlikely to be a problem. Indeed the modern 10mm perpend joint rather than the traditional 5-8mm perpend increases the mass of mortar for any micro cracking to occur and re seal itself.

The choice of cavity tie is important as the shear capacity of the lime mortar is less than a cement mortar. The shape of the tie should provide enough mortar to create the required bond between the mortar and the masonry. This will be provided by a tie with a void at the embedded end. The longer the area of mortar within the void the better.

In summary I cannot see any reason why lime based mortars should not be used with a block inner leaf in walls that are in compression. As with any cement mortars any wall that goes into tension should be analysed by an Engineer using BS5628 – 1 : 2005 as a basis for his analysis.

If Northampton BCO would like to know about lime mortars we suggest he joins the BLF or attends next year's gathering in Cambridge. Alternatively if the Building Control Officer would like to put down on paper his concerns then the BLF can address them.

Follow-up: BCO (Mr Cox) replied: Contrary to the views of this forum, the use of such mortar mix does not conform to the current British Standards when using thermal blockwork. Please refer to the Approved Documents from the Planning Portal website.

Response: Thank you for forwarding Mr Cox's response to you forwarding our advice on the use of lime mortars in thermal blockwork. One of our technical Panel, Michael Beare, Conservation Accredited Engineer of AKS Ward, has responded as follows:

Without a specific reference to a clause in the British Standards it is difficult to give a succinct answer. If you could obtain the clause that Mr Cox is concerned about then we could answer it.

Nobody in AKS Ward knows of any clause that precluded the use of lime mortars on thermal blockwork. We then checked this with a University professor who specialises in the subject and his comments were:

1. "Lime mortar should be better than using cement mortars as it is more compatible with the strength of the block.

2. Lime mortar has better thermal properties and therefore will be less subject to cold bridges.
3. He knows of no clauses that preclude the use of lime mortars in thermal blockwork."

Mr Cox may be referring to the fact that reference to lime mortar was withdrawn from the Codes circa 1965. This was not on any technical grounds but on the basis that people no longer used sand lime mortars. As you will see from the previous email, this is no longer the case and has resulted in a lot of research and the development of the NHBC addendum to the Code of Practice.

The BLF is represented on many bodies considering the use of lime mortars including the BSI, BRE, The Foresight Project, Bath University, Bristol University and English Heritage

14.12 Damp internal wall

Query I am thinking about removing the damp plaster from my internal wall which faces the exterior of the house. The external render had been letting in and there is dampness. So if I take the plaster off, there are 2 brick thick walls with lime mortar, what sealant or product would stop the dust coming off the exposed wall without halting its breath ability?

Answer First and foremost, you state that the external render is letting in water which is leading to the dampness. This being the case, it may be prudent to attend to this in the first instance, either by repairing or replacing the render. You do not state if the render is a lime or cement based – if the latter, this may not be 'breathable' (vapour permeable), so as well as letting the water in (presumably through defects such as cracks), it may be exacerbating the problem by preventing the wall fabric from drying externally through evaporation. Continued dampness within the wall fabric will cause ongoing problems with any plaster and paint coatings internally, so it would be best to stop the problem at its source (i.e. the external render).

If you decide to strip the plaster off the internal walls, the dampness will probably show on the inside face of the wall. Some drying may occur internally, provided the inside of the property is well ventilated, and the internal walls are not coated with an impermeable sealant or coating – almost all products which you might think are suitable will not be breathable, and whilst this may stop surface dusting in the short term, this will only make the damp problems worse.

The above comments are general in nature and may not be specific to your property – the BLF does not provide building specific advice. We would therefore recommend that you seek independent professional advice from a suitable experienced architect, building surveyor or consultant, to ensure that any repairs or work you carry out does not cause greater damage to your property in the longer term.

To know more, there is a list of books about lime on the BLF website. While some of these are technical, some are aimed at the general reader. Try The Old House Handbook by Marianne Suhr for a general introduction.

Follow-up: I had the render cracks cut out, filled and repainted. I was informed it was a cement render and like for like took place. I am hoping this will prevent wetness travelling inside but the dampness that had been there remains and I was thinking, remove the plaster let it thoroughly dry out. But I read that the dust from an exposed brick wall is pretty terrible and if there isn't a product that reduces this whilst maintaining breathability, then maybe leave it until it dries out eventually through the plaster, so annoying it's only a few patches and I can't get the place finished. I had spoken with an architectural surveyor and they advised removing the plaster but this dust issue is a worry, maybe get creative and have areas of exposed brick (damp bits) and leave the rest on.

Response: Patching cracks in external cement render will not prevent damp problems - cement plaster develops micro-cracks that let

in (but not out) water. Removing the interior surfaces will not help if the damp is coming from outside. If this is the case the only answer is to solve the water ingress.

You should check that other aspects are not contributing. Check that the gutters and down spouts are sound and adequate for increased / sudden rainfall. That the ground around the wall footings is well drained and not causing rising damp (flowerbeds against buildings may be attractive but can cause damp to be held against the wall footings). Check that the internal ventilation is adequate to control the humidity level. It is prudent to attend to these matters in the first instance before either repairing or replacing the render.

Consult our reading list and our list of sources of advice and get advice from a conservation accredited building professional (not a building contractor).

BLF Conference Bath & Wells, 5-7 September 2014

-Lisa Edden

The Conference was based at the University of Bath this year with a trip every afternoon to the surrounding area. Friday afternoon saw us all travelling to Wells and a fascinating tour of the Cathedral as a 40 year on celebration of Robert & Eve Baker's pioneering use of lime for the conservation of the figures on the west front of Wells Cathedral. The Baker's work is considered as the start of the lime revival in England. That evening David Odgers who worked with the Bakers gave the Baker Memorial Lecture "Reflections on the Wells experience; legacy and future challenges".

The rest of the weekend was equally fascinating. After shelter coats the hot topic was hot mortars. We also heard about the amazing repairs and restorations of other cathedrals around the world from Newcastle, Australia to Trondheim, Norway and not least George O'Malley's wonderful description his teams achievements in the remodelling of the plasterwork at St Mel's, Longford.

George O'Malley with Jeff Orton and Timothy Richards.

The Conference is a wonderful chance to meet others working in the field of lime from all over

the world. It is a lovely time to reconvene with friends made in previous years - for me seeing the Scandinavian bunch in particular. And you never know who you might bump into - I met up with an Engineer I worked with in London at Alan Baxter and Associates 20 years ago, then a few years into my career and at the start of hers.

We had such a fun weekend catching up and learning together again, not least touring Wells where she is now Engineer to the fabric of Wells Cathedral and Vicars' Close! We will undoubtedly meet again soon.

Ivor McElveen, Kevin Blackwood, Lisa Edden, Yvonne Doyle and Pat McAfee.

I always come away from the Conference each year having had a wonderful intellectual; informative and fun time and I am always inspired to read and do more in the cause of Lime. If you've never had the chance to go to one of the Building Lime Forum Conferences put the following dates in your diary:- Cambridge 18th-20th September 2015

****

Traditional Hydraulic Lime in Ireland?

Extract from:

A SHORT DESCRIPTION
OF
THE GEOLOGICAL FEATURES
OF THE
COUNTY OF LIMERICK.

J. FITZGERALD WINDLE, Assoc. M. Inst. C.E.

Published c. 1900

In the lower beds bivalves predominate, while in those near the Upper Limestone large and beautiful univalves are found in great profusion, such as the *Nautilus*, *Orthoceras*, etc It is magnesian in places, and in the parish of Robertstown, near Barrigone, a limestone is found which burns into a good hydraulic lime which, I am informed by Mr. Horan, the County Surveyor, was used to some extent in the building of the fine sea wall on the road from Foynes to Tarbert; it was also used in building the head race at Askeaton Mills.

The limestone about Askeaton, and, I might say, in the whole of the Baronies of Kenry, Lower and Upper Connelloe, is highly fossiliferous. Some of the specimens which I have from that in the neighbourhood of Askeaton are very perfect. (5)

****

What is the BUILDING LIMES FORUM IRELAND?

The Building Limes Forum encourages expertise and understanding in the use of building limes. It aims to achieve this goal by: - exchanging, collating and disseminating information, through publication of a regular journal and by holding meetings and conferences; -encouraging practical research and development through field studies, trials, monitoring and analysis; -encouraging development of appropriate industrial and craft skills and techniques; -educating building professionals, builders, conservators, craftsmen and women, and property owners in the appropriate use of lime in building

through demonstrations, publications and courses; -developing contacts with institutions and individuals outside the forum and in other countries that have relevant experience or knowledge.

The BLF was established in the UK in 1992. The Irish regional branch was established in 1999, and formally constituted as the Building Limes Forum Ireland in 2005. It is affiliated with the Building Limes Forum UK. It is a voluntary organisation with no commercial ties, the majority of members being actively concerned with the repair of historic buildings and some in new build. The Forum acts as an information network, and publishes newsletters and an annual journal of the Building Limes Forum.

The Building Limes Forum of Ireland is currently looking for new members.

Membership of the Building Limes Forum offers:

- The opportunity to participate in conferences, courses, workshops, demonstrations and visits organised by the Forum;
- An informal network of contacts that is prepared to share information and to discuss matters of general interest to members;
- A means of supporting the stated aims.

www.buildinglimesforumireland.com

Become a member to receive regular updates on upcoming events, seminars and courses.

****

Communicating with your Forum

If you would like to respond to any of the topics on this or further Newsletters or if you want to get involved please contact us in writing by way of post or email.

POST
Attn. of Newsletter Editor
Building Limes Forum Ireland
4 Castle Street
Dublin 2

EMAIL
Attn of Newsletter Editor to
info@blfi.net

****