The Building Limes Forum Ireland Newsletter

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

Ford Madox Brown's Heath Street in Hampstead (1852-65)

Editorial

Welcome to our September 2013 edition of the Building Limes Forum Ireland Newsletter. We hope everyone is in great spirits and fully refreshed after the holiday season and superb summer sun.

Each year the BLFI moves along at a steady pace, growing and adapting. 2013 is no different with the committee stepping up a gear to not alone provide the loyal members with a wide variety of local events and symposia, but also hosting our BLF colleagues from overseas at the Kings Inns, Dublin for the Building Limes Forum International Conference this month.

Hosting an event of this nature takes no little time. There are so many who warrant mention for giving freely of this most precious resource. Too many in fact for these pages, but a special thank-you needs to be made to Kevin Blackwood, our Chairman whose steady hand keeps the rudder straight ahead and Lisa Edden, whose energy and enthusiasm knows no bounds.

From all the committee, we hope all our visitors have enjoyable days in Dublin with, we hope, new friends made and old friendships strengthened.

Outside of the conference, life goes on. Innovative new uses of lime abound and the appetite for lime use seems to be stronger than ever. It's an enjoyable time for many of us but we also know some are hurting. Maybe, in some small way, the BLFI can help in softening some of that pain. An introduction to a potential client, a solid reference, a piece of technical advice, or just a contact to sound-out an idea. These are the little things our Forum can do that can make a big difference for businesses at this time. 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.

The BLFI has had a very active year so far with several events taking place around the country. Thank you to those who attended and in particular to the hard working events and CPD committees, led by Katriona Byrne and Lisa Edden, for producing some superb days out.

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

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Mairin Doddy, Galway County Conservation Officer discussing lime and conservation with Uachtaran na hEireann, Michael D. Higgins at the Volvo Ocean Race in Galway.

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Rinn Duin Medieval Settlement
by Blackwood & Associates

Before Work commences

And after

Blackwood Associates Architects began working on the medieval remains at Rinn Duin in 2009 after an initial assessment in 2008. The site, a peninsula extending into Lough Ree, was settled by the Normans in 1227 when they constructed a large castle. The town wall followed shortly after with its three towers and a gatehouse near the crest of the hill. The wall extended the entire width of the peninsula, approximately 550 meters and continued into the waters of Lough Ree on each side to withstand land attacks. While there has been extensive fabric loss to much of the wall that still remains to one degree or other with the exception to the areas nearest the lake on each side which have been completely lost above ground level. Other buildings on the site include the Parish Church constructed around 1300, the windmill which may be a later 16th Century addition and the Hospital of St. John the Baptist which may predate the construction of the town wall as it lies outside its defences. Very little of the living accommodation remains today as these buildings would most likely have been timber construction and would have long since decayed. The foundations of three domestic scale buildings remain along the centre line of the peninsula, possibly built adjacent to a carriageway connecting the gatehouse to the castle. The town which may have inhabited in excess of 1200 people appears to have been at its peak early in its history and it was captured by the Irish prior to 1343 following a series of recorded attacks since its founding. It changed hands on several occasions throughout the centuries and the castle appears to have been in ruin by the mid-sixteenth century.

By 2008 when Blackwood Associates carried out the first site inspection it was found that all remaining structures on the site were densely covered with an invasive and damaging ivy. In areas it was difficult to identify what stonework remained under the vegetation. It was decided to carry out conservation and stabilisation works to one of the towers on the town wall as a pilot scheme, funded by the Heritage Council, so that the scope of the damage could be established and a suitable conservation methodology prepared for carrying out the works to the entire structure. During the works it was found that roots were deeply embedded in the structure and localised dismantling was necessary to remove these roots. Serious fabric disturbance was uncovered on the wall tops, particularly on the western face of the tower; the lintel of the central opening and much of the stonework was in a very precarious state with substantial fabric loss caused by the ivy

roots. Any of the masonry that had to be dismantled to allow for stabilisation work to be carried out was first recorded in situ to allow for its accurate reinstatement to its original position. A very large amount of organic material had to be removed from the core of the wall prior to any reinstatement taking place. There was a large portion of high level overhanging masonry on the southern end of this elevation which remained in place although the masonry below had collapsed. Though a valiant attempt was made to preserve this in situ, it unfortunately proved not possible and it had to be rebuilt. Expert structural engineering input throughout the project has been provided by conservation engineer Ivor McElveen.

At low level the external corners were severely undermined by loss of fabric. This is a common occurrence throughout the site and it appears to have been caused by livestock rubbing against the stonework throughout the years. Under the supervision of the archaeologist David Sweetman, it was discovered that the line of the undisturbed below ground stonework was still present. This along with the presence of the collapsed original fabric lying in the vicinity allowed the corners to be rebuilt on their original plane by reinstating the original fabric. This proved to be a satisfactory solution to the instability of the tower while protecting the original fabric by reinstating it.

On completion of the stabilisation works a limited pointing programme to the walls as well as pointing the entire wall top was carried out. All sound mortar was retained and pointing applied only to areas where the mortar had degraded or lost completely. It was essential that the wall tops were finished in such a way to shed rainwater as quickly as possible to reduce water penetration. The core stonework was raised slightly to provide a fall to each side and eliminate the potential for ponding and water ingress on completion. While it is not desirable to alter any historic stonework it was felt that it was essential in this case to prevent water ingress through the wall tops. Pinnings were used to reduce the surface area of the mortar on both the wall tops and elevations.

The composition of the mortar for this phase of works was devised using the information gained from the mortar analysis combined with the necessity to create a mortar that was fit for purpose. An NHL 3.5 was used with aggregate sizes to match the existing. While it was found that this mortar was a good match for the original is was not an ideal mix for the pointing works as the large aggregate sizes made it difficult to apply to small joints. This mix was altered in future phases of the works to ensure that the aggregate was a suitable size for carrying out the pointing.

Over the years a variety of mortar mixes using hydraulic lime and lime putty have been trialed in a bid to find the most appropriate solution. Lime putty was used to conserve the central tower (tower 2) that had suffered major recent fabric loss. It suffered a total collapse of one of its external corners in the last fifteen years but luckily the original fabric was not removed from the site so was available for reinstatement. The amount of reinstatement had to be judged carefully to avoid conjecture while also providing the structural stability required by tying the front and side walls together. This work was all carried out with a lime putty mortar and has weathered in successfully over the last two years.

It is proposed to use a hot lime mortar mix for the conservation of a section of the town wall that comprised this year's phase of works. This works is currently commencing on site. It is expected that the hot lime mix will produce a more workable mortar that will aid the re-bedding process while producing a satisfactory finish on completion. This will be monitored closely during the works to ensure it is producing the results expected.

An additional phase of work has been carried out each year since 2009 and conservation works have now been undertaken to all the

towers, the gatehouse and small sections of the town wall along with emergency conservation works to the hospital, chancel arch of the Parish Church and the windmill. Improvements have been made to the methodology each year while each site held its own unique challenges. The chancel arch was in a particularly precarious state but was conserved without the need for radical intervention through careful vegetation removal, pinning and pointing. A Conservation and Management Plan for Rinn Duin has also been prepared by Blackwood & Associates.

While there has been an enormous amount of work carried out during these relatively small phases of works there is still a large amount of endangered stonework remaining at Rinn Duin. Approximately 350 meters of town wall remain to be conserved, some of which is in extremely precarious condition and in danger of further collapse. With the exception of the chancel arch of the Parish Church, works have not taken place to the remainder of this structure, which is also endangered. No conservation works have taken place at all to the castle complex, a vast site with both the remaining castle walls and surrounding walls in a precarious state.

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Fidelma and Pat enjoying a well earned break at the Working with Lime workshop at the James O'Keeffe institute in Newmarket in May.

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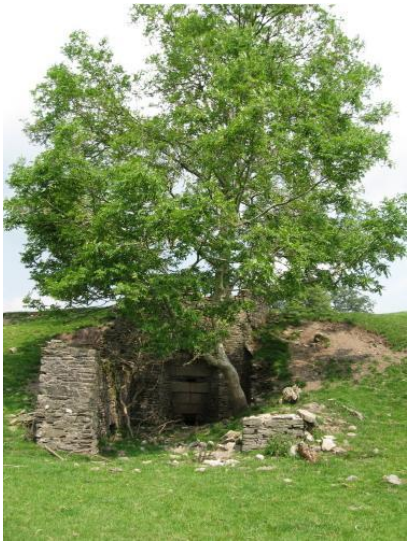
The restoration of Russborough Lime Kiln
-Lisa Edden, Consulting Structural Engineer.



My involvement in Russborough, Co. Wicklow started in 2000 when I first saw the Kiln during the consultation process for the Conservation plan for the demesne.

At that stage we put the actions down as

"Conserve the Lime Kiln by cutting down the trees and killing the stumps. Repair to prevent further decay. Cordon off from livestock."

Activity at Russborough was directed elsewhere for 8 years until at the beginning of 2009 a planning application was filed for the whole estate including the repair of the lime kiln. Much of that infrastructure work was sponsored by Bord Failte and indeed some of the works to the kiln too however that grant has now been drawn down.

James Howley, Architect for much of the repairs to the estate and also for the infrastructure planning process being fully aware of the plight of the lime kiln championed the kiln at the last Building Limes Forum Conference in Durham and initiated an idea to repair the kiln using volunteer labour and donated building materials. James and I approached Eric Blatchford, the CEO of Russborough, who quickly ratified the proposal with the trustees. James and I are both members of Building Limes Forum Ireland and saw this as a great opportunity to not only get experienced stonemasons involved but also less experienced trades and other professions in an educational way. There is also a growing interest amongst us lime advocates and particularly Ivor

McElveen, previous chair of BLFI to use more indigenous lime reducing somewhat the reliance on imported lime from Europe. Hence the first workshop developed into a hot lime workshop and indeed we have been using hot lime mixes throughout the repair works to the external walls. The internal shaft wall is another matter!

The two ash trees finally met their demise in February 2013. At least 65 growth rings have been counted in the stump of the larger tree growing out of the shaft.

Careful excavation around the kiln then followed. The draw area was buried in approximately half a metre of debris. The ash tree stump growing from the south side of the draw area came out quite easily as it had been growing on the debris rather than into the walls or floor.

The root up top was another matter and took another two months to shift!

The debris in the shaft (including many animal bones) was, thank goodness, very successfully rattled out of the draw hole. A sturdy stock fence was erected. This has helped to contain the construction works but more importantly has and will protect from cattle, who like to use walls, both ruinous ones and newly repaired, to scratch against. This stock fence will remain for the foreseeable future albeit long term an alternative arrangement may be installed.

An extensive scaffold was procured to allow us to safely get to the top perimeter wall and allow demonstrations to take place on the scaffold. Temporary demountable timber platforms were installed in the shaft to allow phased access and to seal off the shaft when working at the top perimeter wall.

Only then did the real work start with a Hot Mix Workshop 1st and 2nd May 2013.

These two days saw the blossoming of the late spring and we enjoyed fabulous sunshine and the initiation of the ongoing enthusiasm for this project.

Brian McAfee hard at work

So far stonemasons, dry-stone wallers; plasterers; brick layers; architects and engineers have travelled from France; Co. Clare; Wexford; Tipperary; Belfast etc.

We've had hot-lime specialist Craig Frew from Scotland, and Stafford Holmes, Historic Building Consultant who has experience in repairing other kilns from Warwickshire. Indeed it's hard to keep Stafford away now!

Craig and Hot lime mixing.

We had to get a fellow in with a stump auger and mini excavator between workshops to rid us of the ash tree root which was wrapped around the top of the shaft.

Since the first rather oversubscribed workshop we've had four separate 2-3 day sessions of repair works and will have a few more yet.

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Kevin, Tom and others contemplating the next move.

We hope to be completing the seating of the top stones to the shaft and clay rendering inside the shaft early September.

Veronica getting stuck in at Russborough.

An update on the works in progress including (hopefully) the initial firing will be broadcast during the Building Limes Forum International Conference in Kings' Inn, Dublin 22nd September.

The project has been sponsored by Russborough (The Alfred Beit Foundation) and The Building Limes Forum Ireland.

Eoin & Friends

There have been many stonemasons and others who have turned their hands to mixing mortar shifting stones; repairing arches; laying stones; mixing clay mortars etc. who have devoted many hours to this project and our thanks goes out to all. And all materials have been kindly donated by suppliers.

(I will be collating all the names and hope to list out during the conference talk)

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Cat with two tails, Gobann Saor woz 'ere, Newcastle Co. Tipperary

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Friendships made at the Lime and sand display at Westport House, Co. Mayo

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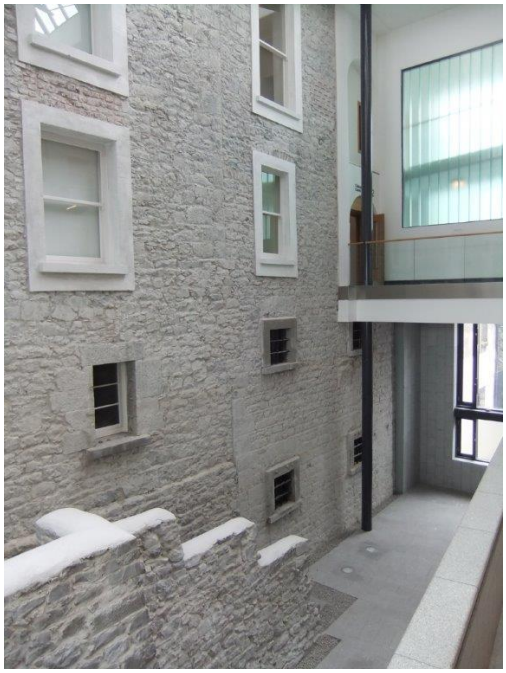
Kilkenny Walking Tour
Summer 2013

Each year the BLFI organises a 'Show and Tell' walking tour. After the success of Dublin and Cork in recent years this summers' event took place in Kilkenny. The 'Show and Tell' format is for members only and is designed for frank and open discussions on the good, bad and ugly about projects. It is a wonderful way to see work, assess it and discuss it, without the restrictions of a lecture room.



Kilkenny walking tour site

Ivor McElveen –Kilkenny Show & Tell.

Michael O Boyle directing operations.

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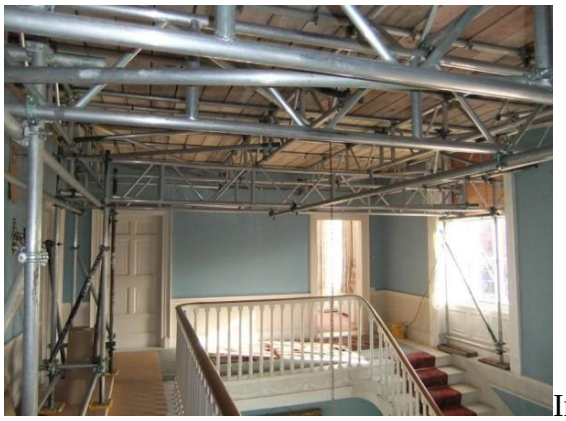
The Deanery, St Patrick's Cathedral, Dublin – Ceiling Strengthening works.
- Lisa Edden, Consulting Structural Engineer.

This late 18th century building is a rebuild of Jonathan Swift's Deanery of 1713's which burnt down in 1781. Although the extent of the rebuild is not clear (there are still possibly medieval parts predating Swift) the ceilings which are discussed here date from the late C18th rebuild.

The building continues to be occupied by the Dean of St Patrick's Cathedral.

The ceiling structures throughout the building span between 5.8 and 6.1m and are formed of small red deal (Pinus sylvestris) ceiling joists of approximately 80-120mm deep x 45-55mm wide. This form of very long span small ceiling joists are particularly common in Ireland.

The ceiling joists were working extremely hard to hold the lath and plaster ceilings and in places had deflected over 100mm and resulted in significant cracking to the plasterwork. This cracking was particularly noticeable along the cornice running parallel to the joists and as diagonal ceiling cracking to the corners of each room. The severe central deflection was much less noticeable in the room but became apparent on entry to the attics.



In 2011 repair works were instigated, firstly with the more damaged flat and accessible rear ceilings and completed in 2012 with the particularly inaccessible vaulted main stair hall ceiling. All of the repairs commenced with assessment of the ceiling timbers and in some cases temporary support. The roof structure above the ceilings was known to be of reasonable condition and structural integrity and therefore could be used as the permanent support structure for the ceilings below without the need for insertion of additional primary structure.

Some local replacement of collar ties within the roof was undertaken and then the ceiling joists were hooked up to these and the rafters by means of timber hangers and metal bands. Care was taken to hang new crawl boards for attic access onto the roof structure wherever possible rather than impose maintenance loads onto the ceiling structure.
Then, and only then, the ceiling lath and plaster repairs were instigated in the form of washers below set into the plaster wired off metal bands over the joists.
The repairs to the main stair hall in particular required a very large intrusive scaffold to provide access to the underside of the ceiling and safety for operators within the attic.
With the scaffold in place paint analysis and an interim upgrade in decoration were undertaken.

This project had the advantage of a reasonable secure roof structure and an attic that was to be used for services and maintenance only. Structural strengthening of floors or habitable attic spaces is another matter entirely and perhaps should form a follow on article in the next newsletter.

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Restoration of chimney at Augnagaddy House Ramelton, using reclaimed Bangor Blue Slates to match existing – Tir Conall Restoration/ Sean Brogan.

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Deirdre joins the BLFI team

Deirdre Bloomer-Daly has taken over the BLFI recording secretary and admin roles from Romy Kanitz who has returned to her native Germany. Deirdre is an Architect and Architectural technologist who worked with Niall D Brennan Associates for 13 years. At work she met her good friend Romy Kanitz and through Romy became Aware of the BLFI. She hails from Laois and is almost settled in Dublin. Currently enjoying learning about lime while getting stuck into the BLFI administration and is very much looking forward to an exciting limey education at the upcoming conference. Deirdre's new career specialty of 'Web developer' and her two little boys keep her very much on her toes.

Editor: We are very glad you've joined us Deirdre. We hope you enjoy your time with the BLFI. Farewell to **Romy Kanitz** and good wishes to her in her new life in Germany where she recently was married. Best wishes from all your friends at the BLFI.

Also, last but very much not least, we must extend our very best wishes to **Katriona Byrne** who steered our events committee over the last few years and was a hugely dedicated member of the BLFI committee. Unfortunately for us Katriona has joined English Heritage in the UK and she will be sorely missed in the BLFI and in the building conservation community in Ireland. Best of luck Katriona in your new job and new home in England.

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'WEAK' MORTARS
-By Anna Meehan

People are often scared of 'weak' mortars but if the joints are well packed by someone who takes the trouble to do the job properly, should it not work well? Earth was widely used as a mortar in farm buildings - mainly for reasons of economy and often there is very little lime in the mix. In those cases a weak hydraulic lime is a much stronger mortar than the building will have had in the past, and whilst I don't think it would actually cause a problem, would using it be more for convenience sake than anything else? For a farm building using an entirely earthen mortar should function perfectly well, although it would not last so long as a mix with lime in it and you don't want to have the expense of repointing it too often!

In the five years that the REPS 4 traditional farm buildings grant scheme has been in existence we have had one case of a project using lime putty. Thanks to Ivor McElveen we now also have hot lime mixes being used for the very first time on the scheme on a project in county Wexford. Other than that there is prevalent use of NHLs, and particularly NHL3.5. This is very understandable as there is a strong ethos within the scheme to support self performed work. As a way of 'future proofing' the buildings we also want to continue to use the local builder who has always carried out the repairs and who may have little or no experience in the use of building limes. The performance of NHLs tend to be predictable provided the advice in relation to mixes and sand is followed and are therefore good for someone who has not used lime before. Even those builders experienced with various lime mixes prefer the predictability of the NHL mortars. Weather as ever is also a factor.

I think that farm buildings could be the very buildings that might provide an opportunity to experiment on. After all it's not supporting the roof over the owner's head. Depending on the skills available would there not be an

opportunity on some buildings of replicating the traditional mortar or at least using more locally based materials? From the perspective of vernacular building I think the closer we can get to local sourcing of materials the better. Certainly there is the risk of failure if carried out by amateurs but on the other hand if done by professional skilled builders could prove expensive which for a predominantly vernacular scheme does not sit well. Do we then need a knowledgeable, interested enthusiast to ensure some certainty of performance? I also want the various conservation advisers engaged on the scheme to be able to sleep soundly!!

Thoughts from others experienced in the use of 'weak' mortars would be much appreciated.

Anna Meenan
Project Manager
REPS 4 Traditional Farm Buildings Grants Scheme

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Hemp/Lime Render on bungalow- Brendan Kelly

Brendan writes: This house was a 1970s prefab. The walls are 2 inch concrete slabs dry lined on the inside with half inch plasterboard. Zero insulation. We put six inches of hemp/lime insulation and finished it with a sand and lime plaster properly floated and finished. The owners of this house can be contacted directly and the project can be viewed by appointment. The owners will explain the difference and the savings made by this insulation process.

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New Lime render comprising of carefully selected lime, aggregates and oxide pigments to match existing render – Oakfield, Raphoe, Co. Donegal. By Sean Brogan.

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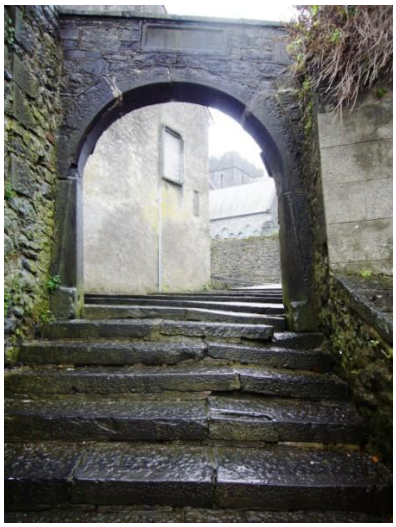
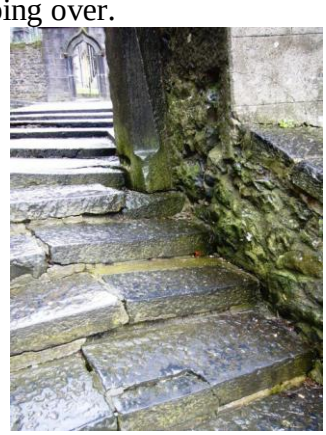
Investigation and stabilising of Gateway Arch, St Canice's Steps, St Canice's Place, Kilkenny for Kilkenny Borough Council. -By Ivor McElveen



St Canice's arched gateway is located at the top of St Canice's Steps leading from Dean Street in the city, up to the Coach Road at St Canice's Cathedral. It was built in 1614, and the flight of twenty-six limestone steps and arch are the medieval ceremonial route

between the ecclesiastical and civil authorities.

The arch measures approximately 2050 mm in width and 2550 mm high at the centre point. It is of stilted design and the side column imposts are approximately 360 mm wide. It is constructed with four granite cut-stone voussoirs with no keystone, the two outer being springers mounted on cambered cut-stone column imposts. The side spandels and crown, which contains a plaque either side, are constructed of random rubble stone with a coping over.



On initial examination the arch appeared stable albeit off the perpendicular with possibly a slight twist or moment. There was much evidence of progressive settlement which was adversely affecting its structural integrity and exerting considerable stress. There was also evidence of some attempted repairs in the past and which had little remedial effect. Previous filler and pointing repairs, some of which had used incorrect materials, continued to show signs of failure acting as a *tell-tales* of progressive movement.

Considerable collapse had occurred of the steps at the base of the western column impost and which in turn had undermined the column causing support failure for this side of the arch. This resulted in the opening of the joints in the vicinity of the voussoirs and impost itself, as well as causing structural cracks in the infill masonry.

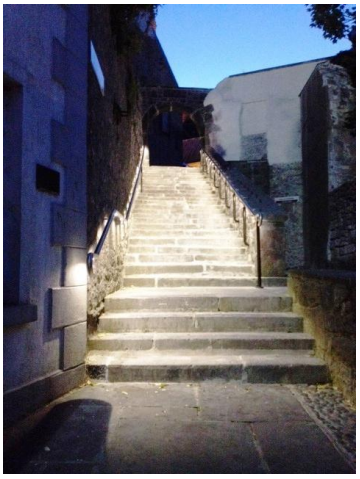
The cause of this progressive collapse which appeared to have been taking place over some considerable time was initially found to be due to surface rain water cascading down the steps in storm conditions due to the failure of a shore drain to the upper western side of the arch. When this occurred water penetrated between the joints of the steps into the substrata material which in turn lost its compressive strength experiencing a change in viscosity causing permanent and progressive settlement, thus failing to give support to the steps and reducing their level and posture, as well as undermining the foundation material of the western column impost.

On further investigation, however, it was discovered that there was a failure of an ancient but still active underground storm drain which ran under the column impost. This released storm water causing severe scouring creating a large cavity under the column impost adding substantially to its further deterioration and ultimate foundation collapse which could have been imminent.

Being a Recorded Monument and a Protected Structure dismantling and re-building the arch was not an option. A timber cradle was designed to clamp the arch which was suspended from above by two universal beams spanning from the top of adjacent walls. This held the arch firm and in situ while the steps could be removed and the foundation of the western column excavated giving access to the storm drain for repairs and in providing a new reinforced concrete foundation for the column impost, all of which was successfully completed. The adjoining steps were reset and levelled with repairs been undertaken to the remaining flight of steps.

On the removal of the cradle support, the arch and adjoin walls were repaired and re-pointed using various hot-lime mixes. These comprised non-hydraulic quick lime gauged with NHLs to impart various degrees of hydraulicity. Hot-mixes were chosen for their strong adhesion and good workability as well as load supporting qualities and proven durability. From samples examined of the original mortar it was also a more authentic replication of what had been used in medieval times during the construction of the arch.

Although on occasions hot-mixes had been used previously in Ireland this was the first time that various formulations were used for future comparative study. The expertise of Craig Frew of Craig Frew Building Conservation Ltd, Sterling, Scotland (a member of the UK Building Limes Forum Committee) was required who specialises in lime mortars and where hot-mixes are used in Scotland on a regular basis. He also advised on the preparation and mixing as well as on Health and Safety procedures. The quicklime was complimentary from Clogrenanne Quarries of the CRH Group who facilitated testing and were very supportive throughout the project. Paul Tallis of Pat Tallis & Co together with Eugene Butler, mason, quickly adopted methods for the mixing of the mortars which they found exceptionally easy to work with.



The repair, pointing, harling and capping mortar formulations were designed to provide a variety of working conditions and anticipated durability and ranged from 1.0 quicklime/1.5 NHL/3 sand to 0.5 quicklime/1 NHL/2.5 sand. The hydraulic limes were either 5.0 or 3.5 NHLs selected for low free lime content. On occasions lime dust (10%) was added to aid setting as well as pea gravel. The locations and areas of application of the various formulations have been recorded for monitoring.

One of the more welcome aspects of the project has been the interest and support provided by Emir Slattery, Executive Engineer, Kilkenny Borough Council, in the specifying and using hot-lime mixes. Such leadership and support from Local Authorities will help further the use of *re-discovered* lime technologies to the benefit of our built heritage and particularly in the use of indigenous materials and finding more cost effective solutions to its repair and maintenance.

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Radius cast iron guttering and lime render to Old Church at Derrybeg Co. Donegal – Sean Brogan

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James Powell & Ivor McElveen in correspondence on making a hybrid hot lime mixing.

James,
I followed on your heels on Friday to find the lads singing your praises on the work done by you on Thursday. (They are now out of stones).
Of interest was your methodology for the mixing of the mortar in the rotating drum cement mixer. What did you do? They did not manage as well on Friday mixing dry and adding water after. The result was a residue of un-slacked lime in the mortar.
Could you write up the sequence of what you actually did?

Further, I wonder is there any conversions which we could do to the conventional drum mixer by, say, removal of baffles and adding 'rounded' rocks or some such as is sometimes done when mixing for NHLs. In these instances the angle of tilt is reduced slightly so as to improve 'folding' and to avoid splash-out.
Would Craig like to comment as, like it or not, the drum mixer will be used (adapted?) and we had better get a methodology and H&S out on this.

Ivor

And in reply:

Hi Ivor,
After some experiments I found that putting around 1/2 - 3/4 of the sand into the mixer with all of the lime, a short dry mix 30 seconds or so, then add most of the water which resulted in a slurry, leave that a little and add the rest of the sand. The slurry stage seemed to control spitting better than gradual additions of water.
Another 60 seconds or so later add the ground limestone, at this stage the mix starts to dry rapidly so constant additions of water are required to keep wetting down to workable mix. If the water is added too slowly the heavy solidifying mix then drops into the newly added water splashing it out alarmingly. If too much water is added at the beginning the mix flows out of the mixer.
We were trying to get the biggest possible mix, so it might be possible to put almost all the water in early if the mix was smaller.
Our mix was two buckets struck level of sand, (approx 2.5 gallons each bucket) 1 gallon each NHL and quick lime and 1/2 gallon limestone dust. Water requirement varied with the dryness of the sand and was between 2 and 3 gallons.
The mixer constantly needed to be dug out after almost every mix, around a full bucket of mix would stick in the mixer each time. Big stones in the mix might help, I do not know.
The mixer was tilted back a little more than normal as we did not have a stand and it was on some pallets on a bit of a slope.

I would like to try a mix with quick lime only and see how that went, maybe with the limestone dust as well.

Hope this helps
James Powell

Note from Editor – Please send comments or suggestions on hot-lime mix ideas to info@blfi.net and we will happily publish them in the next newsletter. Please note that the Newsletter can be used in this way to facilitate communication between one member and another. We neither endorse nor condone ideas, products or people but we can facilitate discussion. The BLFI does not give professional advice. Advice on mixing, materials, methodologies etc. should always come from a professional advisor, architect or engineer or from your product supplier.

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Fidelma and friend get to grips with lime plastering in Newmarket

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Traditional Lime and flag floor – Co Donegal – Sean Brogan

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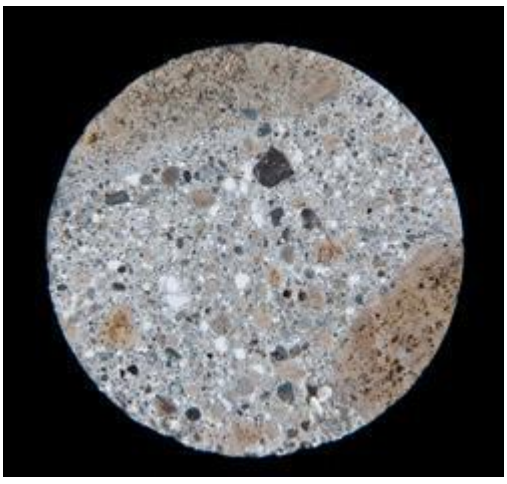
To improve today's concrete, do as the Romans did
By Sarah Yang – Berkeley

In a quest to make concrete more durable and sustainable, an international team of geologists and engineers has found inspiration in the ancient Romans, whose massive concrete structures have withstood the elements for more than 2,000 years.

Chris Brandon of the ROMACONS project collects a sample of ancient Roman concrete drilled from a breakwater in Pozzuoli Bay, near Naples, Italy. The breakwater dates back to around 37 B.C. (D. Bartoli photo, courtesy of J.P. Oleson)

Using the Advanced Light Source at Lawrence Berkeley National Laboratory (Berkeley Lab), a research team from the University of California, Berkeley, examined the fine-scale structure of Roman concrete. It described for the first time how the extraordinarily stable compound – calcium-aluminum-silicate-hydrate (C-A-S-H) – binds the material used to build some of the most enduring structures in Western civilization.



Sample of ancient Roman maritime concrete from Pozzuoli Bay near Naples, Italy. Its diameter is 9 centimeters, and it is composed of mortar formulated from lime, volcanic ash and chunks of volcanic tuff. (Carol Hagen photo)

The discovery could help improve the durability of modern concrete, which within 50 years often shows signs of degradation, particularly in ocean environments.

The manufacturing of Roman concrete also leaves a smaller carbon footprint than does its modern counterpart. The process for creating Portland cement, a key ingredient in modern concrete, requires fossil fuels to burn calcium carbonate (limestone) and clays at about 1,450 degrees Celsius (2,642 degrees Fahrenheit). Seven percent of global carbon dioxide emissions every year comes from this activity. The production of lime for Roman concrete, however, is much cleaner, requiring temperatures that are two-thirds of that required for making Portland cement.

The researchers' findings are described in two papers, one that was posted online May 28 in the *Journal of the American Ceramic Society*, and the other scheduled to appear in the October issue of the journal *American Mineralogist*.

"Roman concrete has remained coherent and well-consolidated for 2,000 years in aggressive maritime environments," said Marie Jackson, lead author of both papers. "It is one of the most durable construction materials on the planet, and that was no accident. Shipping was the lifeline of political, economic and military stability for the Roman Empire, so constructing harbors that would last was critical."

Marie Jackson holds a 2,000-year-old sample of maritime concrete from the first century B.C. Santa Liberata harbor site in Tuscany. (Sarah Yang photo)

The research team was led by Paulo Monteiro, a UC Berkeley professor of civil and environmental engineering and a faculty scientist at Berkeley Lab, and Jackson, a UC Berkeley research engineer in civil and environmental engineering. They characterized samples of Roman concrete taken from a breakwater in Pozzuoli Bay, near Naples, Italy.

Building the Empire

Concrete was the Roman Empire's construction material of choice. It was used in monuments such as the Pantheon in Rome as well as in wharves, breakwaters and other harbor structures. Of particular interest to the research team was how Roman's underwater concrete endured the unforgiving saltwater environment.

The recipe for Roman concrete was described around 30 B.C. by Marcus Vitruvius Pollio, an engineer for Octavian, who became Emperor Augustus. The not-so-secret ingredient is volcanic ash, which Romans combined with lime to form mortar. They packed this mortar and rock chunks into wooden molds immersed in seawater. Rather than battle the marine elements, Romans harnessed saltwater and made it an integral part of the concrete.

The researchers also described a very rare hydrothermal mineral called aluminum tobermorite (Al-tobermorite) that formed in the concrete. "Our study provided the first experimental determination of the mechanical properties of the mineral," said Jackson.

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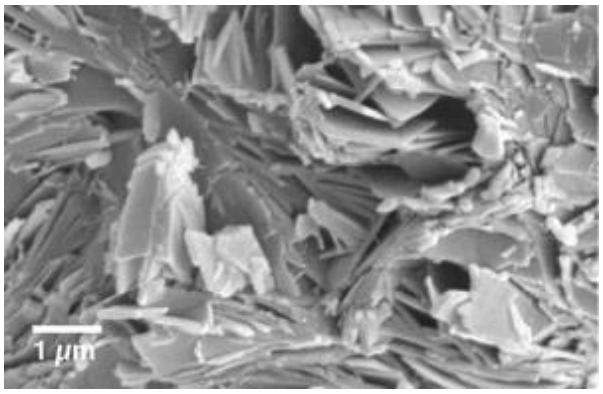

This scanning electron microscope image shows crystals of a rare mineral, Al-tobermorite, magnified about 25,000 times. UC Berkeley researchers characterized Al-tobermorite in samples of Roman concrete. (Image courtesy of UC Berkeley)

So why did the use of Roman concrete decrease? "As the Roman Empire declined, and shipping declined, the need for the seawater concrete declined," said Jackson. "You could also argue that the original structures were built so well that, once they were in place, they didn't need to be replaced."

An earth-friendly alternative

While Roman concrete is durable, Monteiro said it is unlikely to replace modern concrete because it is not ideal for construction where faster hardening is needed.

But the researchers are now finding ways to apply their discoveries about Roman concrete to the development of more earth-friendly and durable modern concrete. They are investigating whether volcanic ash would be a good, large-volume substitute in countries without easy access to fly ash, an industrial waste product from the burning of coal that is commonly used to produce modern, green concrete.

"There is not enough fly ash in this world to replace half of the Portland cement being used," said Monteiro. "Many countries don't have fly ash, so the idea is to find alternative, local materials that will work, including the kind of volcanic ash that Romans used. Using these alternatives could replace 40 percent of the world's demand for Portland cement."

The research began with initial funding from King Abdullah University of Science and Technology in Saudi Arabia (KAUST), which launched a research partnership with UC Berkeley in 2008. Monteiro noted that Saudi Arabia has "mountains of volcanic ash" that could potentially be used in concrete.

In addition to KAUST, funding from the Loeb Classical Library Foundation, Harvard University and the Department of Energy's Office of Science helped support this research. Samples were provided by Marie Jackson and the Roman Maritime Concrete Study (ROMACONS), sponsored by CTG Italcementi, a research center based in Bergamo, Italy. The researchers also used the Berlin Electron Storage Ring Society for Synchrotron Radiation, or BESSY, for their analyses.

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Horses for Courses

Manfredi Anello, our BLFI committee member offers this piece, first in Italian and then translated. Enjoy.

Carne equina nei tortellini: è allarme! Cemento portland nelle malte di calce: è normale?

La presenza di tracce di carne equina ha seminato il panico tra produttori e consumatori di tortellini e lasagne

preconfezionati. Lo scandalo della carne di cavallo si allarga a macchia d'olio, l'ultima novità è il suo ritrovamento anche nelle polpette svedesi vendute all'Ikea.

Nei prossimi giorni saranno ulteriori esami dei NAS ad accertare se si può ipotizzare solo una frode in commercio (per la vendita di un prodotto diverso da quello indicato) o se c'è un rischio per la salute per l'eventuale presenza di carne di animali sottoposti, ad esempio, a doping.

Ma cosa avviene per le malte pronte a base di NHL - Calce Idraulica Naturale? Il presentimento è che, facendo degli esami appropriati, nei premiscelati scopriremo abbondante presenza di cemento portland. Già nel 2007, una ricerca condotta dall'allora ICR - Istituto Centrale del Restauro - su 22 prodotti omogenei, tra i più diffusi sul mercato, appartenenti alla categoria merceologica degli 'intonaci deumidificanti a base calce', aveva messo in luce molte discrepanze tra quanto riportato sulle schede tecniche e quanto effettivamente presente nelle malte, evidenziando tra l'altro l'impiego non dichiarato di cementi grigio e bianco.

Vediamo cosa succede per lasagne e tortellini e poi... forse sarebbe il caso di dare nuovamente un'occhiata ai premiscelati. E, in attesa degli esami, che fare? Mentre le mamme di tutta Italia ritornano ai fornelli e abbandonano i cibi precotti, chi si occupa di ediliza e restauro farebbe bene a recuperare le validissime 'vecchie ricette di cantiere', e tornare a formulare malte secondo la tradizione, con aggregati selezionati e calci naturali le uniche 'garantite' da secoli di utilizzo e sicuramente 'cement free' !

Google Translate gives:
The presence of traces of horse meat has caused panic among producers and consumers of pre-packaged tortellini and lasagne. The scandal of horse meat spreads like wildfire, the latest discovery is his also sold in the Swedish meatballs at Ikea.

In the next few days will be further examination of the NAS to determine whether it can be assumed only a fraud on the market (for the sale of a product other than that specified) or if there is a health risk for the presence of animal meat subjected, for example, to doping.

But what happens to the mortars prepared based NHL - Natural Hydraulic Lime?

The hunch is that, by making the appropriate testing in premixed discover abundant presence of Portland cement.
Back in 2007, a survey conducted by the then ICR - Central Institute of Restoration - 22 of homogeneous products, the most popular on the market, belonging to the product category of 'dehumidifying lime-based', had revealed many discrepancies between what reported on the data sheets and the amount actually present in the mortar, showing amongst others undeclared employment of cement gray and white.

Let's see what happens for lasagne and tortellini and then ... perhaps it would be appropriate to give a look at the pre-mixed again.

And, waiting for the tests to be done?
While the mothers in Italy back in the kitchen and leave the pre-cooked meals, those involved in restoration and building industry would do well to recall the very valid 'old recipes site', and return to make mortars according to tradition, with selected aggregates and natural limes the only 'guaranteed' by centuries of use and definitely 'cement free'!

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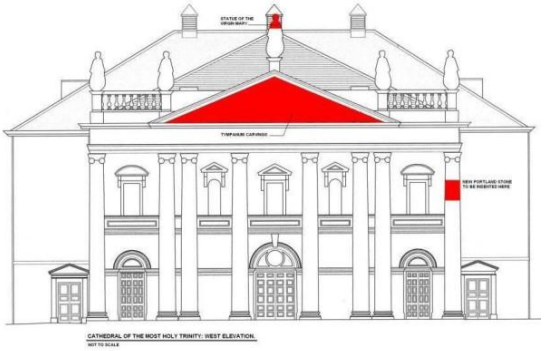
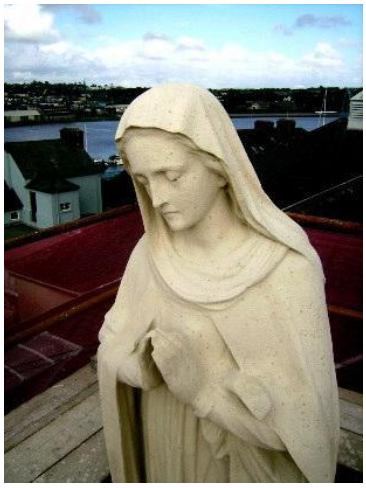
Restoration work at the Holy Trinity Cathedral using stone grafting, plastic repair mortars, shelter coats and lime washes. Lime used throughout under the guiding hand of Bill Walsh, Architect from CJ Falconers practice in Waterford.



Location of eroded masonry and falling debris –above the main entrance!

Before



After

Above – Before work commenced with Angels hand missing, facial features eroded, inappropriate cement re-pairs, ponding of water in bas-relief, erosion and decay widespread.

And after...

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Winter Working
-Ivor McElveen

It is inadvisable to work with lime renders below temperatures of 5 degrees centigrade. The winter rain/frost cycle common in Ireland (and Scotland) can be particularly hazardous. The snap early morning frost followed by a fairly instant thaw can be the torment of the conscientious gardener, and the precautions that have to be taken against such an eventuality can often be quite elaborate. For lime render it would be the same, but even more difficult due to the size of the areas involved and their location.

The BLFI* have found that moderately hydraulic lime mortars and renders (NHL 3.5) moist cured at +15 C developed reasonable frost resistance after 14 days. Those cured at

10 C took 28 days and those cured at 5-10 C took 56 days. Feeble hydraulic lime, NHL 2:00 would fare worse.

Usually first frosts can occur in parts of Ireland around late October with a more persistent and variable frost by late November. Considering average temperatures indications are that mortar or render applied by 1st Oct would have some resistance by mid-Oct; mortar/render placed by 7th Oct would take until end-Oct to adequately cure/carbonate/set and after mid-Oct would have little resistance until late Nov. Of course this varies with location and degree of protection. Mortar/render placed after the 1st December might never properly carbonate and fail in due course and if 'fixed' would in all probability weather badly.

It is good practice to apply lime renders between late spring and early autumn, avoiding October to March for the above reasons. This is particularly so for large areas and/or where the provision of protection is difficult.

*Building Limes Forum of Ireland: recommend reading *'Lime Works'*, produced by the BLFI and can be obtained by the BLFI Web site, www.buildinglimesforumireland.com , or purchased from the IGS.

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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)

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BLFI website Forum

www.buildinglimesforumireland.com

The Building Limes Forum Ireland has progressed significantly in recent years. The emphasis in the past has been on Limes and all aspects of its use in building, both in conservation and new build. This year and onwards there is an equal emphasis on Forum. Our new website has a secure platform for communication between members. This not only enhances the development of the forum, but also facilitates direct contact between members, where discussions can take place, questions can be raised and answers (hopefully) given. The Forum establishes a network of like-minded people, concerned with the use of lime in building. This should give rise to topical discussions based on a robust mix of theory and practice.

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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.

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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

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