Hydraulic lime

From Wikipedia, the free encyclopedia

Hydraulic lime is a variety of lime, a slaked lime used to make lime mortar. *Hydraulicity* is the ability of lime to set under water. Hydraulic lime is produced by heating calcining limestone that contains clay and other impurities. Calcium reacts in the kiln with the clay minerals to produce silicates that enable the lime to set without exposure to air. Any unreacted calcium is slaked to calcium hydroxide. Hydraulic lime is used for providing a faster initial set than ordinary lime in more extreme conditions (including under water).

Contents

Use in construction

Hydraulic lime is a useful building material for the following reasons:

- It has a low modulus of elasticity.
- There is no need for expansion (movement) joints.
- It allows buildings to "breathe", and does not trap moisture in the walls.
- It has a lower firing temperature than Portland cement, and is thus less polluting.
- Stone and brickwork bonded with lime is easier to re-use.
- Lime acts sacrificially in that it is weaker and breaks down more readily than the masonry, thus saving weaker stone such as sandstone and limestone from the harmful effects of temperature expansion and mortar freeze.
- It is less dense than cement, thus less cold bridging.
- Lime re-absorbs the carbon dioxide (CO_2) emitted by its calcination (firing), thus partially offsetting the large amount emitted during its manufacture. The more hydraulic a lime, the less CO_2 is reabsorbed during set, for example, 50% of CO_2 is reabsorbed by NHL 3.5 during the set, compared to 100% of CO_2 being reabsorbed by pure calcium hydroxide (fat lime putty).

Classification

Natural hydraulic lime (NHL) is classified for different uses:[1]

Feebly hydraulic lime

Feebly hydraulic lime (NHL 2) is used for internal work and external work in sheltered areas.

Feebly hydraulic lime contains upto 10% clay/ clay mixed with other impurities. It might take one week or more to set after the addition of water. Setting is the process of permanently taking the shape into which lime has been moulded.

Moderately hydraulic lime

Moderately hydraulic lime (NHL 3.5) can be used for external work in most areas.

Moderately hydraulic lime contains clay in the range of 11% to 20%. This type of lime sets (assumes given shape) within a few days after the addition of water.

Eminently hydraulic lime

Eminently hydraulic lime (NHL 5) is used for external work in exposed areas, such as chimneys and for floor slabs/underpinning.

Eminently hydraulic lime contains clay in the range of 21% to 30%. Properties of eminently hydraulic lime are close to those of cement. Eminently hydraulic lime sets within one day after the addition of water.

See also

- Lime plaster
- Lime mortar
- Quick lime

References

1. ^ http://www.tarmac.co.uk/BuxtonLime/hydrauliclime.aspx

External links

- The Technology and Use of Hydraulic Lime, by John Ashurst
- The National Lime Association (US & Canada)
- How to use hydraulic lime and PDF application fact sheets
- The Scottish Lime Centre

chimney masonary

Ken Hinshaw

From: "Michel" <transmin@sonic.net>
To: "Ken Hinshaw" <kenl@redshift.com>
Sent: Wednesday, July 20, 2011 9:58 AM
Subject: Point Pinos Lighthouse

Dear Mr. Hinshaw,

I believe that the Lighthouse was build around 1850. At this time, Portland cement based products did not exist in the US. Consequently, there is a very strong probability that a lime mortar was used as it was the only mortar available at that time. This assumption is confirmed when you describe the mortar as very soft.
The key, here, like in all preservation/restoration project, is not to mimic the existing mortar, but to use a mortar which is compatible and will preserve the original. The use of a Natural Hydraulic Lime (NHL) will certainly fullfill these requirements. I would recommend a mix, by volume, of 1 NHL 3.5 with 2.5 sand which will result to a 800 psi compressive strength at 24 months. If it is a small scale job, it may be more efficient to use the premix Ecomortar G or F-3.5, depending of the size of the joints. The use of lime in marine environment is highly recommended. The lime is not affected by salt.
What kind of paint do you plan on using? We would strongly recommend the use of lime paint of lime wash because of compatibility.
I would also recommend to go on http://www.limes.us/restoration.php?cat=5 where you will find very useful information about repointing with NHL.
Please, do not hesitate to contact me directly if you have any questions.

Sincerely,

Michel

Michel Couvreux
TransMineral USA, Inc.
201 Purrington Road (Mail)
Petaluma, CA 94952
2105 S. McDowell Blvd Ext, Suite D (Office)
Petaluma, CA 94954
707-769-0661
707-769-0352 Fax
transmin@sonic.net
www.limes.us

You have an information request from:

Ken Hinshaw

Email Address : kenl@redshift.com

Question or comment :
Hello: We are restoring a historic lighthouse. The chimneys are painted red brick with very soft motar. We intend to repoint the motar and repaint the chimney. The original motar is probably lime base. Would it be best to replace it with original type? What steps would you recommend before we repaint?
Ken Hinshaw
Preservation Coordinator
Pt. Pinos Lighthouse
Pacific Grove, Ca.

Scope of Work for Pt. Pinos Chimneys 10-5-11

1) Power wash chimneys to remove loose paint on the lowest pressure setting that will effect the process.

2) Rake back all mortar 1 inch, repoint joints.

3) Prime and paint chimneys and flashing.

4) Install missing chimney cap.

5) Mortar and paint will be provided.

Ken Hinshaw coordinator of preservation
Pt. Pinos Lighthouse

MADSEN MASONRY

Lic # 863321

66 Southbank Road • Carmel Valley, CA 93924
cell: (831)236-3956 • home/fax: (831)659-0746
shaddmadsen@gmail.com

clean & regrout

Job Bid

From Shadd Madsen
To Ron Hinshaw
Company
Date 8/20/11
RE: P.G. Lighthouse

Work Description:

Clean and regrout existing chimneys
3 days labor @ $95 per hour. Price includes 1 Mason and 1 Helper

Materials	Amount
Misc. Materials	100
scaffold rental	125
15%	33.75
Materials	$ 258.75

24 hrs @ $95	Labor	$ 2280
		$
	Total Amount	$ 2538.75

1440
3978 75

Ken Hinshaw

From: "Shadd Madsen" <shaddmadsen@gmail.com>
To: "Ken Hinshaw" <KenL@redshift.com>
Sent: Saturday, August 27, 2011 9:32 AM
Subject: Re: Estimates from Madsen Masonry

Ken,
I don't usually do painting, but I suppose we could. Would you supply the paint? Dry time will effect labor costs with all the set up and take down of scaffolding. I would estimate another 3 days for painting and cap installation. 24 hours @ $60 for a labor total of $1440.
Shadd

On Mon, Aug 22, 2011 at 8:12 AM, Ken Hinshaw <KenL@redshift.com> wrote:

Shadd: thanks for the quick response. Re. the lighthouse bid: I assume you were going to use lime base mortar. I spoke to Michel at TransMineral USA, Inc.(who supplied products to the Royal Presidio Chapel) about our needs, if you cannot source what you need locally he may be a good resource. Would you include the labor to prime and paint the chimneys as well as installing the two copper caps. I understand that this may add cost. Also, the picture you sent, is that Bob Jones? I look forward to receiving a revised bid to take into account the above.
Thank you, Ken

> ----- Original Message -----
> **From:** Shadd Madsen
> **To:** kenl@redshift.com
> **Sent:** Saturday, August 20, 2011 3:39 PM
> **Subject:** Estimates from Madsen Masonry
>
> HI Ken,
> Here are the prices for your projects. I have also attached a photo of Bob Jones- somewhere I have more.
> I also have a piece of limestone that would be big enough for a mantle if you want.
> Call me if you have any questions. (831)236-3956 / 659-0746.
> Thanks,
> Shadd

Mahoney Masonry Inc.
P.O. Box 2296
Carmel Valley, CA 93924
CSL# 493213

JOB ESTIMATE

PHONE:	831-659-0363
DATE:	12/7/11

TO: Ken Hinshaw coordinator of preservation
747 Short Street
Pacific Grove,Ca.93950

JOB NAME/LOCATION
Point Pinos Lighthouse
Asilomar
Pacific Grove,Ca.93950

JOB DESCRIPTION:

Set Scaffolding for both chimney's and wire brush loose material off bricks. Repair cracked or missing mortar with provided lime mortar. Prime and paint chimney's and flashing with provided materials. Install chimney caps. Remove scaffolding.

	3,800.00

CSL# 493213 Valid 15 Days

THIS ESTIMATE IS FOR COMPLETING THE JOB AS DESCRIBED ABOVE. IT IS BASED ON OUR EVALUATION AND DOES NOT INCLUDE MATERIAL PRICE INCREASES OR ADDITIONAL LABOR AND MATERIALS WHICH MAY BE REQUIRED SHOULD UNFORESEEN PROBLEMS OR ADVERSE WEATHER CONDITIONS ARISE AFTER THE WORK HAS STARTED.

ESTIMATED JOB COST $ 3,800.00

ESTIMATED BY

x _____

TRAVAILLE

BROTHERS AND OTHERS

PROPOSAL

DESIGN - DRAFT - BUILDING - HOME WATCH SERVICES
CALIFORNIA GENERAL CONTRACTOR LICENSE 58457

December 1, 2011

Dear PG,

For $3,168.00 my company will build scaffolding, prep, re-point and paint the two chimneys at the old lighthouse. I understand that the City owns and will provide the paint and chimney caps.

Sincerely,

Mark Travaille

Mark Travaille

PO BOX 52104 - PACIFIC GROVE CA 93950 - PHONE: 831-373-6949 - 831-917-1794

Lighthouse Chimney
Repairs
12/1/11

JOB CATEGORY	Labor	Materials	Subs	Overseeing
Owner to provide permits,				
paint and sheet metal				
Labor				
Scaffolding	340.00	200.00		60.00
Prepping surfaces	720.00	40.00		60.00
Repointing		40.00	440.00	60.00
Painting	540.00	40.00		60.00
Clean up and move out	220.00			60.00
	1,820.00	320.00	440.00	300.00
5%	91.00	16.00	22.00	15.00
5%	91.00	16.00	22.00	15.00
	$2,002.00	$352.00	$484.00	330.00
				$3,168.00

Mahoney Masonry Inc.

P.O. Box 2296
Carmel Valley, CA 93924
CSL# 493213

JOB ESTIMATE

PHONE:	831-659-0363
DATE:	10/7/11

TO: Ken Hinshaw coordinator of preservation
747 Short Street
Pacific Grove,Ca.93950

JOB NAME/LOCATION
Point Pinos Lighthouse
Asilomar
Pacific Grove,Ca.93950

JOB DESCRIPTION:

Set scaffolding for both chimney's and power wash old paint off. Rake back old mortar between bricks 1" and repoint with provided lime mortar. Prime and paint chimneys and flashing with provided primer and paint. Install provided chimney cap. Remove scaffolding.

	4,011.00

CSL# 493213 Valid 15 Days

THIS ESTIMATE IS FOR COMPLETING THE JOB AS DESCRIBED ABOVE. IT IS BASED ON OUR EVALUATION AND DOES NOT INCLUDE MATERIAL PRICE INCREASES OR ADDITIONAL LABOR AND MATERIALS WHICH MAY BE REQUIRED SHOULD UNFORESEEN PROBLEMS OR ADVERSE WEATHER CONDITIONS ARISE AFTER THE WORK HAS STARTED.

ESTIMATED JOB COST $ 4,011.00

ESTIMATED BY x

CONDITIONS SURVEY EXTERIOR WITH SPECIFIC RECOMMENDATIONS

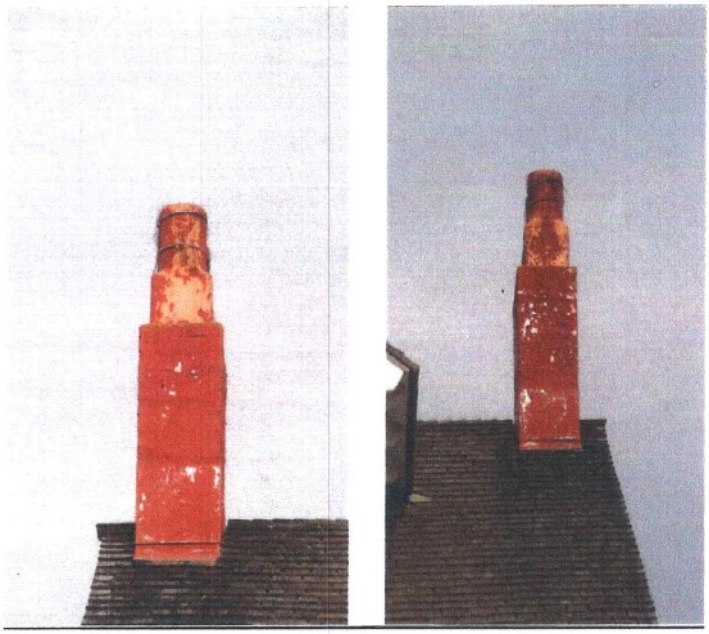

Figure 51 & 52: NORTH & SOUTH CHIMNEY SYSTEMS.

QCR-POOR - MDPR -SERIOUS TO CRITICAL

CHIMNEYS: The end gable chimneys are constructed of fired red brick with a protective stucco coating. They are topped by clay pipe flues which have wire screening to prevent bird entry. There is a metal flashing at the base of the chimneys as they meet the cedar shake shingle roof.(Flashing material appears to be metal other than copper which would have been used historically and which has a longer life span in hostile coastal environments.)The overall condition of both brick chimney systems is rated POOR. Most of the protective paint coating has failed and there is widespread loss of the protective stucco as well. We noted extensive loss of mortar joints on both chimney systems which could result in loss of structural integrity, especially during a high wind event. The repair to the chimney systems should be performed by qualified contractors.

CONDITIONS SURVEY EXTERIOR WITH SPECIFIC RECOMMENDATIONS

Figure #53: TYPICAL CONDITION OF CHIMNEY SYSTEM **POOR.**

QCR-GOOD-POOR - MDPR -SERIOUS TO CRITICAL

The overall condition of the chimney system is rated as **POOR.**

There is a widespread **CRITICAL** need to repair all sides of the chimneys as there is comprehensive failure of coating systems, stucco, mortar joints, brick faces, and extensive structural cracks throughout the chimneys. There is fungus contamination. During the last roof installation a stainless steel flashing material was used to provide water tightness between the chimneys and cedar shake shingles. While stainless steel is normally recommended in a hostile coastal environment, its use on a historic structure is inappropriate in areas that are highly visible. Stainless steel unless etched does not receive and retain paint coatings as well. Copper would be a material that was used historically, it has longevity in a hostile coastal environment, and does not require painting. Flashing should be tucked into a mortar joint that has been scored and then sealed with appropriate material to prevent water entry behind or between brick and flashing.

Figure #54:

CONDITIONS SURVEY EXTERIOR WITH SPECIFIC RECOMMENDATIONS

Figure #55 : CHIMNEY SYSTEM

Wire screen has been strapped to the top opening of the clay pipe flue in order to prevent bird entry. The wire and straps are in an advance state of deterioration and are rated as POOR. It is recommended that the strapped wire system be replaced by inserting a bronze disc into the flue opening in a manner that it cannot be seen yet will achieve the purpose of preventing bird entry.

Figure #56: CHIMNEY SYSTEM

CONDITIONS SURVEY EXTERIOR WITH SPECIFIC RECOMMENDATIONS

Figure #57 : CHIMNEY SYSTEM

Failed paint and stucco should be removed to expose brick and mortar joints for proper evaluation of existing conditions and in order to develop proper scope of work. Brick and mortar joints should be inspected for damage. Mortar joints which are soft or damaged should be raked to remove loose material. Compression strength test should be conducted on stucco and mortar joint material to insure that replacement material does not exceed the compression strength of the historic material. Bricks damaged beyond repair should be replaced with bricks matching in texture, size, and quality. Stucco should be re-applied in lifts to allow proper drying without producing cracks or failure. Proper masonry primer should be used to seal stucco prior to application of historically appropriate finish coat.

CONDITIONS SURVEY EXTERIOR WITH SPECIFIC RECOMMENDATIONS

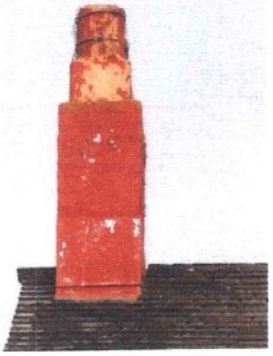

Figure #58: CHIMNEY SYSTEM

Flashing is a painted stainless steel which is not historically or aesthetically appropriate. It is recommended that during the next cedar shake shingle roof replacement, consideration be given to replacing the stainless steel with copper.

Figure #59: CHIMNEY SYSTEM

CONDITIONS SURVEY EXTERIOR WITH SPECIFIC RECOMMENDATIONS

Figure #60: TYPICAL EXISTING CONDITION OF HISTORIC CHIMNEY SYSTEM.

Under no circumstances should the firebox and chimneys ever be used as designed for open flame heating. A qualified electrician should be contracted to determine if a lightning suppression system should be installed on the tops of the chimney system. Staff and /or volunteers should monitor for any leaks around ceilings on interior of living quarter's rooms.

CONDITIONS SURVEY EXTERIOR WITH SPECIFIC RECOMMENDATIONS

BRICK CHIMNEYS

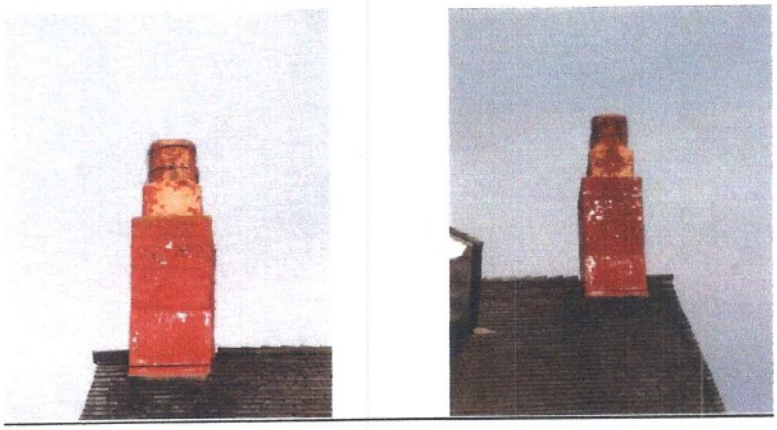

Figure 61 & 62: CHIMNEY SYSTEM.

OCR- FAIR to POOR/ MDPR -SERIOUS to CRITICAL.

* Take mortar sample from area with loose mortar and stucco for testing to establish mortar & stucco compression strength and composition.

* Rack all loose mortar joints & stucco to remove material that has lost its integrity.

* Mortar joints with a depth greater than 1/8th should be repaired using mix of mortar with compatible compression strength and composition. A mortar color should be achieved to match as closely as possible the historic mortar color on surfaces which will not be re-coated. Contractor should provide a "mock up" test area prior to widespread re-pointing. Mortar joints with a depth greater than ¼ inch should be repaired using more than one lift of mortar so as not to apply mortar mix too thick.

* Areas with failed stucco should be removed and repaired with matching mix, applied in lifts rather than one thick application.

* Areas with extensive spalling of hardened brick face should be removed for replacement of damaged brick. (Note: Exposed softer brick core will attract and retain moisture and result in additional damage to adjoining brick and mortar joints).

* Replacement brick must match exactly historic brick in terms of color, strength, size, and texture.

* In areas with loss of brick use same standards as those applied to replace extensively spalled brick.

CONDITIONS SURVEY EXTERIOR WITH SPECIFIC RECOMMENDATIONS

* In areas with structural cracks, rack cracks of loose debris. Fill cracks with compatible grout or approved elastomeric caulking.

* In areas with hairline cracks fill cracks with approved elastomeric caulking.

* Prime all masonry surfaces intended to be painted with approved masonry primer.

Finish coat all masonry surfaces intended to be painted with colors determined by paint color analysis and /or other documentation.

PRESERVATION / STABILIZATION / RESTORATION.

Refer to: Preservation Brief # 6: Dangers of Abrasive Cleaning to Historic Buildings.

Preservation Brief # 2: Re pointing Mortar Joints in Historic Buildings.

Preservation Brief # 1: The Cleaning and Waterproof Coating of Masonry Buildings.

★ **STANDARDS FOR TREATMENT:**
PRESERVATION / STABILIZATION / RESTORATION

Ken Hinshaw

From: "Michel" <transmin@sonic.net>
To: "Ken Hinshaw" <kenl@redshift.com>
Sent: Wednesday, July 20, 2011 9:58 AM
Subject: Point Pinos Lighthouse

Dear Mr. Hinshaw,

I believe that the Lighthouse was build around 1850. At this time, Portland cement based products did not exist in the US. Consequently, there is a very strong probability that a lime mortar was used as it was the only mortar available at that time. This assumption is confirmed when you describe the mortar as very soft.
The key, here, like in all preservation/restoration project, is not to mimic the existing mortar, but to use a mortar which is compatible and will preserve the original. The use of a Natural Hydraulic Lime (NHL) will certainly fullfill these requirements. I would recommend a mix, by volume, of 1 NHL 3.5 with 2.5 sand which will result to a 800 psi compressive strength at 24 months. If it is a small scale job, it may be more efficient to use the premix Ecomortar G or F-3.5, depending of the size of the joints. The use of lime in marine environment is highly recommended. The lime is not affected by salt.
What kind of paint do you plan on using? We would strongly recommend the use of lime paint of lime wash because of compatibility.
I would also recommend to go on http://www.limes.us/restoration.php?cat=5 where you will find very useful information about repointing with NHL.
Please, do not hesitate to contact me directly if you have any questions.

Sincerely,

Michel

Michel Couvreux
TransMineral USA, Inc.
201 Purrington Road (Mail)
Petaluma, CA 94952
2105 S. McDowell Blvd Ext, Suite D (Office)
Petaluma, CA 94954
707-769-0661
707-769-0352 Fax
transmin@sonic.net
www.limes.us

You have an information request from:

Ken Hinshaw

Email Address : kenl@redshift.com

Question or comment :
Hello: We are restoring a historic lighthouse. The chimneys are painted red brick with very soft motar. We intend to repoint the motar and repaint the chimney. The original motar is probably lime base. Would it be best to replace it with original type? What steps would you recommend before we repaint?
Ken Hinshaw
Preservation Coordinator
Pt. Pinos Lighthouse
Pacific Grove, Ca.

masonry Pt Pinos

Ken Hinshaw

From: "Michel" <transmin@sonic.net>
To: "Ken Hinshaw" <kenl@redshift.com>
Sent: Friday, July 29, 2011 11:25 AM
Subject: Point Pinos Lighthouse

Ken,

Here are a few names with phone numbers:

- Mike Courney, Giampollini/Courtney. 415 345 1218.
- Eddy, Pat Scott Masonry. 805 683 9194.
- Tony Quinn Masonry. 650 369 4347.
- Ben Epperly. 510 367 7713.
- Ace Repointing. 323 263 1970.

Do not hesitate to call me if you have any questions.

Michel

Michel Couvreux
TransMineral USA, Inc.
201 Purrington Road (Mail)
Petaluma, CA 94952
2105 S. McDowell Blvd Ext, Suite D (Office)
Petaluma, CA 94954
707-769-0661
707-769-0352 Fax
transmin@sonic.net
www.limes.us

Ally: thank you, we will be in touch when we find a mason. Is there someone who you have worked with in the Monterey area?
Ken
----- Original Message -----
From: "Ally at TransMineral" <transmin@sonic.net>
To: "Ken Hinshaw" <KenL@redshift.com>
Sent: Friday, July 22, 2011 8:39 AM
Subject: Re: Point Pinos Lighthouse

> Mr. Hinshaw:
>
> I am not sure if Michel answered this question. The answer is yes, you
> can order direct from us if you so choose. Michel is out of the office
> until next Thursday, the 28th.
> Thank you.
>
> Ally Brandon
> TransMineral USA

> 201 Purrington Rd - Mailing Address
> Petaluma, CA 94952
> 2105 S. McDowell Blvd, Suite D - Showroom
> Petaluma, CA 94954
> 707-769-0661
> 707-769-0352 Fax
> transmin@sonic.net
> www.limes.us

lime putty is in the form of a putty made from just lime and water.

Trans Mineral USA

SAINT ASTIER Na

Contact Us about Saint Astier Natural Hydraulic Lime

Please feel free to contact us with any questions or to set up an appointment to see our showroom.

TransMineral USA, Inc.

Phone: 707-769-0661 | Fax: 707-769-0352

Showroom & Shipping Address:
2105 S. McDowell Ext. Suite D
Petaluma, CA 94954
Map

Mailing Address:
201 Purrington Road
Petaluma, CA 94952

Send us an email...

First Name:

Last Name:

Email Address:

Please enter your question or comment:

Please enter the word above:

Submit

TransMineral USA, Inc. is a member of the following organizations and associations:

Lime mortar

Lime mortar

Topic Home Discussion Definition

Lime mortar is a type of mortar composed of lime, an aggregate such as sand, and water. It is one of the oldest known types of mortar, dating back to the 4th century BC and widely used in Ancient Rome and Greece, when it largely replaced the clay and gypsum mortars common to Ancient Egyptian construction.

With the introduction of portland cement (OPC) during the 19th century the use of lime mortar in new constructions gradually declined, largely due to portland's ease of use, quick setting and compressive strength.

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With the introduction of portland cement (OPC) during the 19th century the use of lime mortar in new constructions gradually declined, largely due to portland's ease of use, quick setting and compressive strength. However the soft, porous properties of lime mortar provide certain advantages when working with softer building materials such as natural stone and terracotta. For this reason, while OPC continues to be commonly used in brick and concrete construction, in the repair of older, stone-built structures and the restoration of historical buildings the use of OPC has largely been discredited.

Despite its enduring utility over many centuries, lime mortar's effectiveness as a building material has not been well understood; time-honoured practices were based on tradition, folklore and trade knowledge, vindicated by the vast number of old buildings that remain standing. Only during the last few decades has empirical testing provided a scientific understanding of its remarkable durability.

Uses

Lime mortar is used as an alternative to ordinary portland cement. It is made principally of lime (hydraulic, or non hydraulic), water and an aggregate such as sand.

Non-hydraulic and hydraulic

Hydraulic limes set under water and non-hydraulic limes need air to carbonate and therefore set.
To produce hydraulic lime mortars the lime is derived from lime stone containing impurities.
A non hydraulic lime is produced from high purity calcium lime stones.

In the past, countless lime kilns all over countries such as Britain burnt lime stones of varying qualities - many of these lime stones containing impurities. The lime thus having varying degrees of hydraulicity, making them unsuitable for today's industrial processes but due to its water resistancy suitable for building. Most of those kilns ceased production as portland cement gained widespread use replacing hydraulic lime. Today mainly non-hydraulic limes for lime plasters is produced and a very small number of kilns are still producing hydraulic lime for the building industry to standards which are now expected of any building material.

Non-hydraulic lime

Non-hydraulic lime is primarily composed of calcium hydroxide (generally greater than 95%).
Non-hydraulic lime is produced by first heating of sufficiently pure limestone (calcium carbonate) to between 954° and 1066°C, driving off carbon dioxide, to produce quicklime (or calcium oxide). This is done in a lime kiln. The quicklime is then slaked – thoroughly mixed with water to produce liquid slurry: the lime putty or with less water to produce dry powder: a hydrated lime(or calcium hydroxide).

The slaking process involved in creating a lime putty is an exothermic vigorous reaction which initially creates a liquid of a cream consistency. This then has to be matured for between 2 to 3 months - depending upon environmental conditions - to allow time

Ask a question about '**Lime mortar**'

Start a new discussion about '**Lime mortar**'

Answer questions from other users

Full Discussion Forum

Unanswered Questions

I have seen a 90 year old Courthouse building with granite stone masonry in lime mortar. A fire incident occured in this building resulting in debondi...

Encyclopedia

Lime mortar is a type of mortar composed of lime, an aggregate such as sand, and water. It is one of the oldest known types of mortar, dating back to the 4th century BC and widely used in Ancient Rome and Greece, when it largely replaced the clay and gypsum mortars common to Ancient Egyptian construction.

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Non-hydraulic lime is produced by first heating of sufficiently pure limestone (calcium carbonate) to between 954° and 1066°C, driving off carbon dioxide, to produce quicklime (or calcium oxide).This is done in a lime kiln. The quicklime is then slaked – thoroughly mixed with water to produce liquid slurry: the lime putty or with less water to produce dry powder: a hydrated lime(or calcium hydroxide).

The slaking process involved in creating a lime putty is an exothermic vigorous reaction which initially creates a liquid of a cream consistency. This then has to be matured for between 2 to 3 months - depending upon environmental conditions - to allow time for it to condense and mature into a lime putty.

A matured lime putty displays a physical property known as "thixotropic" which means that when a lime putty is physically agitated it changes from a putty into a more liquid state. This aids its use for mortars as it makes a mortar easier to work with and apply. If left to stand following agitation a lime putty will slowly revert from a thick liquid back to a putty state. It is always advised that a lime mortar should be "knocked up" prior to its use.

As well as calcium based limestone, dolomitic limes can be produced which are based on calcium magnesium carbonate.

A frequent source of confusion regarding lime mortar stems from the similarity of the terms hydraulic and hydrated.

- Hydrated lime is any lime other than quicklime, so can refer to either hydraulic (hardens underwater) or non-hydraulic (doesn't harden underwater) lime.
- Stored lime putty is always non-hydraulic (since hydraulic putty sets quickly after mixing) and, as the name suggests,