

ADVISORY to CONTRACTORS and HOMEOWNERS NEWBURYPORT HISTORICAL COMMISSION

MASONRY

Using the correct lime mortar on historic brick is one of the most important elements to prevent moisture retention and to save the old brick in your house which can cause considerable damage.

Old bricks are much more porous than modern bricks. The softness of the old bricks also accounts for the wonderful heating properties that are often missing in new fireplaces; new brick does not absorb the heat readily to radiate the heat into the room.

Mortar joints must be softer than the material they support. Mortar joints are the 'sacrificial lamb' through which moisture is allowed to escape from the house. When moisture is trapped in the building by an especially hard mortar (Portland cement – describe Portland cement in a callout on the side – ie the stuff from home depot), it has no place to go except into the soft brick. The soft brick then starts to spall or peel away in layers or small chunks.

Using a modern mix of mortar including a lot of Portland cement will only cause moisture retention and often cracking in areas adjacent to where you have done the repair. In **no** instance should large quantities of Portland cement be used on old brick. Portland cement does not allow moisture to evaporate or move out of the structure. **This includes repointing the brick whether on the interior or exterior of your house.**

Grinding

Extreme care must be used when cleaning out old mortar joints. The best solution for a small area is the use of hand tools, taking care not to injure or chip the brick. On very important historic houses that the federal government is involved in, only hand tools are allowed to be used to avoid damaging the brick. In larger areas that need to be repointed, often power tools such as grinders are used. The grinding wheel must be substantially smaller than the joint itself and should only be used by an experienced operator. Major damage is often caused to old brick by grinding out the mortar and cutting the surface of the brick either underneath or on the top. This causes the brick to become porous and allows moisture into the brick, causing spalling or chipping of the brick to occur. The brick is then compromised and repairs are much more expensive.

Patching

If a brick needs to be replaced, use old, matching brick. Do not replace with new brick if possible.

Cleaning masonry

At all costs do not sandblast brick!!

This causes the face of the brick to become porous, allowing water to enter the building and cause additional damage to the structure. There are times when brick must be cleaned, but extreme caution must be used. Please refer to Preservation Brief #1 "Assessing Cleaning and Water-Repellent Treatments of Historic Masonry buildings" from the US Department of the Interior / National Park Service. The specific web page for this is: <http://www.nps.gov/history/hps/tps/briefs/brief01.htm>

For thousands of years, masonry joints have been made out of two materials: lime and sand. European buildings hundreds of years old still retain this mortar mix and are as solid as the day they were built.

In the United States, Portland cement came into widespread use by 1930. As a result, several generations of brick masons, have little to no experience using lime mortar. **The use of hard Portland cement mixes on old brick is to be avoided at all costs and can cause irreparable and expensive damage to old houses.**

Modern Portland cement mixes last approximately 30-35 years.

Lime mortar mixes have been known to last ***in excess of 100 years*** without needing to be repointed.

Sources

The information contained in this Advisory originates from the following sources:

1 - US Department of the Interior Preservation Briefs #1 (title) and #2: "Repointing Mortar Joints in Historic Masonry Buildings" (<http://www.nps.gov/history/hps/tps/briefs/brief02.htm>). We **strongly** urge your masonry contractor to read this in its entirety.

2 - Members of the Newburyport Historical Commission, experienced Newburyport preservationists, and preservation consultants including Richard Irons, restoration mason.

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The following three lime mortar formulas were used on two city-owned buildings and one owned by the National Park Service. ****Homeowners are**

advised to use these for repointing the old brick of their Newburyport buildings.**

City Hall Mix (c. 1851)

used Natural Hydraulic Lime (NLH)

1 part NHL 3.5 and 2 to 2.25 parts sand for repointing brick

1 part NHL 5.0 and 2 to 2.25 parts sand for setting reused brick and new restoration brick

Important: To avoid the bright white color of the new mortar joints the mortar was colored to achieve the more muted color. However, the best way to dull down the brightness is by using more yellow or brown sand. Fine brown sand often has some good clay content and gives a more muted, off-white appearance.

See actual specifications for use.

Derby House, Salem (c. 1762)

1 part NHL 5.0 and 2.5 parts sand for repointing brick

The National Park Service architects prefer the NHL 5 for exterior work in New England

Custom House Mix (c. 1835)

9 parts masonry sand (ASTM C144 where possible and appropriate)

3 parts lime – Minuteman Type S Hydrated – Old Castle Stone Products, Lee, MA

1 part white Lehigh brand –White Portland Cement (ASTM C150)

Note: In this project mortar was not colored and will remain bright white until it weathers

Lime Mortar Resources:

St. Astier and Virginia Lime Works brand lime mortars are available through the following companies:

Pennsylvania Lime Works

www.palimeworks.com

Andrew deGruchy

P.O. Box 151

Milford Square, PA 18935

215-536-6706

215-536-2281(F)

helpme@repointing.com

www.stastier.com

Virginia Lime Works

P.O. Box 516

Monroe, VA 24574

<http://www.virginialimeworks.com/products.htm>

TEL: 434/929-8113

FAX: 434/929-8114

For the homeowners, small amounts of pre-mixed lime mortar can be purchased in 5-gallon buckets and even colored to match your existing mortar. Contractors can buy lime mortar by the pallet-load if needed.

For owners interested in mortar analysis, see U.S. Heritage Group, Inc. [at http://www.traditional-building.com/brochure/members/limemortar.shtml](http://www.traditional-building.com/brochure/members/limemortar.shtml)