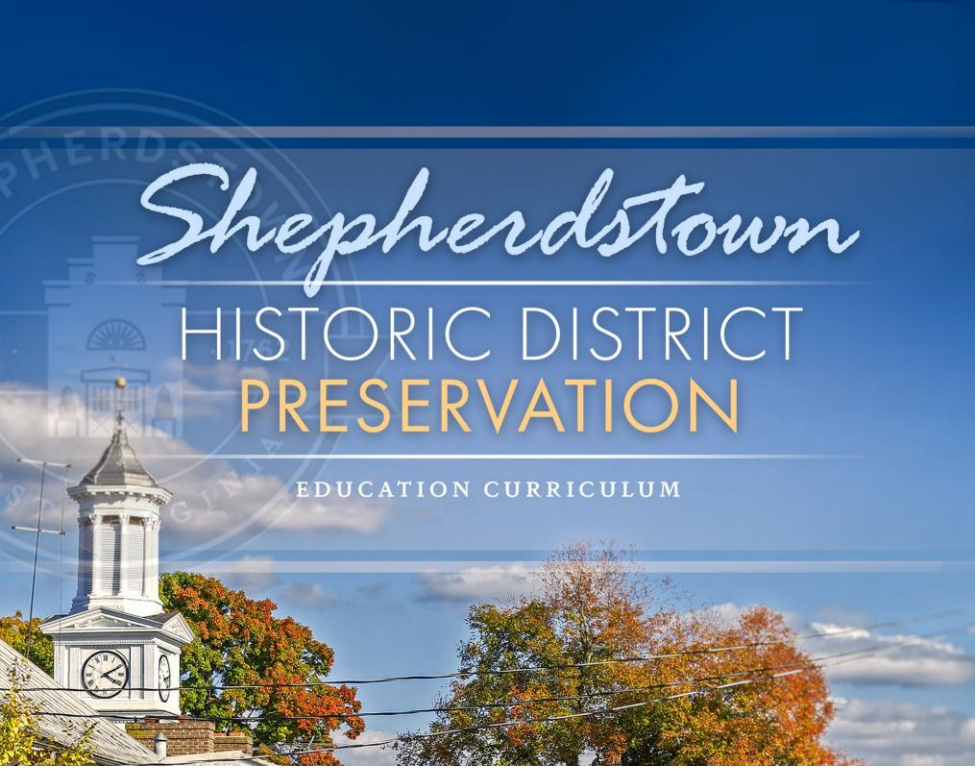


SHEPHERDSTOWN

Masonry Preservation Education

HISTORIC BRICK & MORTAR MAINTENANCE

What are Bricks?

In caring for bricks, it is important to remember where bricks come from.

Bricks are a manmade ceramic product made from clay-rich earth baked at a high heat.

Local Brick and Mortar production in Shepherdstown:

The Weis family took over a local brick kiln back in 1804.

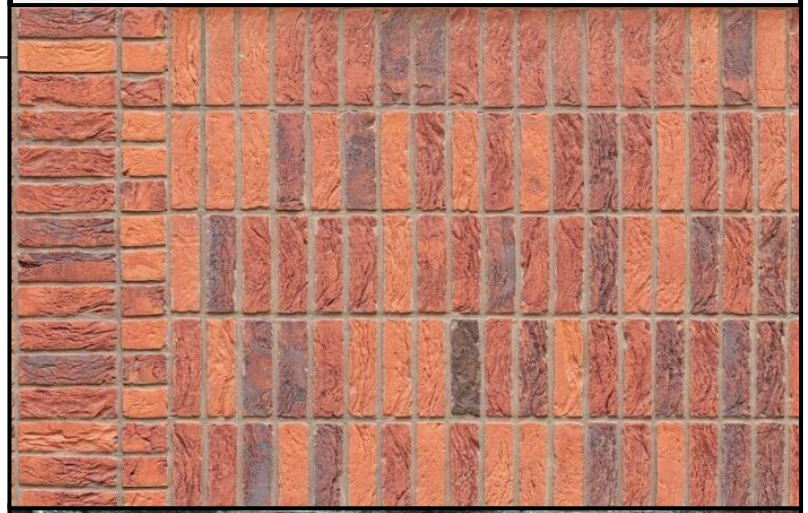
Dr. Henry Boteler's cement mill, built in 1829, was the first in the Potomac River Valley.

Types of Brick

Common Brick – produced as the standard brick without extra aesthetic qualities. These bricks make up most of the masonry in brick walls and buildings and are made from common brick clay.

Face Brick – produced with a finer, aesthetically appealing, uniform color and surface, sometimes with an additional glaze made to be used in a street-facing façade to dress up a building's outer appearance. These are more costly and can range in color and appearance.

Clinker Brick – produced with wet clay placed close to the fire in the kiln, the result is often an irregularly shaped, partially vitrified brick that tends to be more water and frost-resistant. They possess a higher density and a darker, more varied appearance.



Shepherdstown
has a legacy of brick

This March 1899 Sanborn Fire Map illustrates the high concentration of brick structures (the buildings illustrated in the red/pink color) in Shepherdstown's downtown.

Masonry Pointing

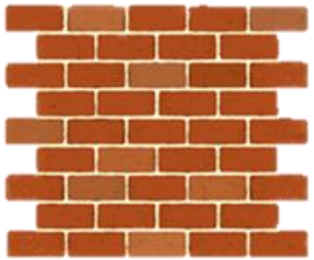
The term pointing can be defined as the finishing of mortar joints located between brick or stone. Historic masonry materials last a long time when taken care of. Brick and stone are durable, and they don’t damage easily as long as they are allowed to perform with their intended partner: lime-based mortar. The mortar between these materials allows historic masonry walls to breathe and shed moisture. This mortar has a shorter service life and requires routine maintenance to keep the structure’s integrity intact.

Masonry Repointing

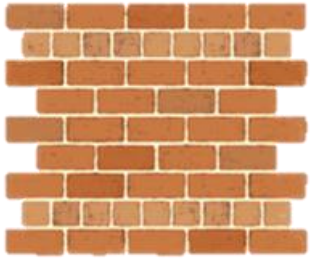
Repointing is the process by which masons remove deteriorated or damaged mortar from the joints and replace it with new mortar. Not only will repointing improve the stability of the structure itself, but it will also benefit the aesthetic appeal of your stone or brick as well.

Though repointing is beneficial, it is not an easy remedy for any lingering structural deficiencies your home might be suffering from. It's important to find the source of the problem you're experiencing before assuming a repoint job will fix it. Ask your local masonry professional to take a look at the area before planning any work.

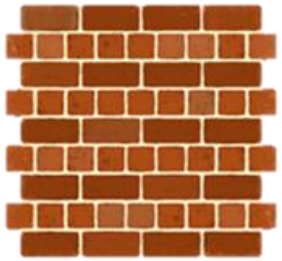
Most Common Brick Bonds



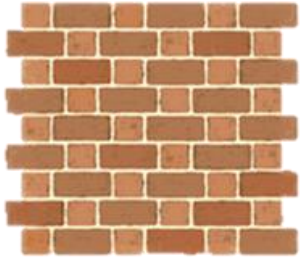
Running



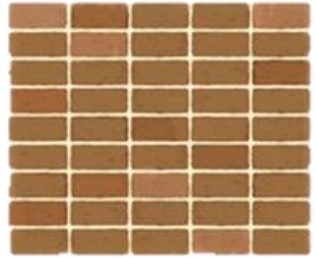
Common



English



Flemish



Stack

Orientation of Bricks

A brick is given a classification based on how it is laid and how the exposed face is oriented relative to the face of the finished wall.

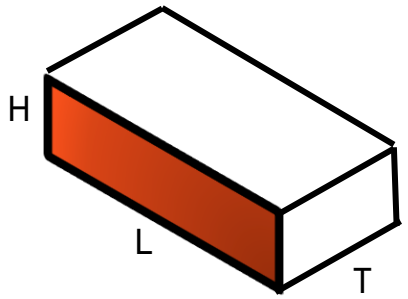
Stretcher: a brick laid flat along its thick, long side with its long, narrow side exposed. This is the most common bedding orientation.

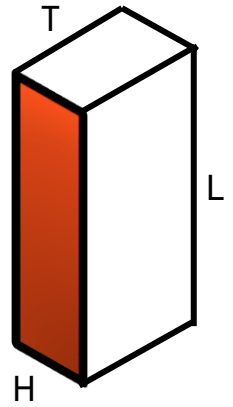
Soldier: a brick laid vertically with its long, narrow side exposed. Typically seen over openings in the wall over windows or doors.

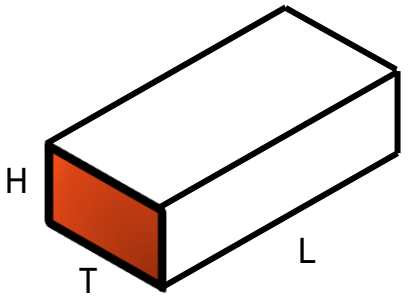
Header: a brick laid flat with its width exposed. Often used within a course to tie the wall together across the stretcher courses.

ORIENTATION

Length x Height x Thickness



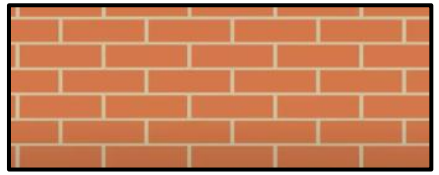


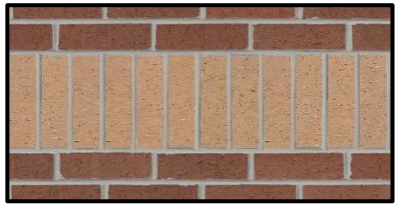


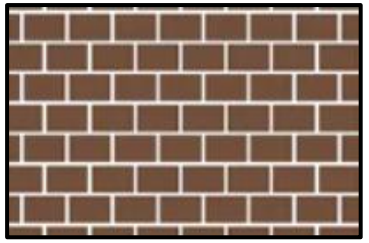
Stretcher

Soldier

Header







Variety of Joints in Masonry

Historic Masonry makes use of a variety of pointing joints differing in color, texture, profile, width, style, and tool marks.

Rough Grapevine Pointing

Large Grain Flush Pointing

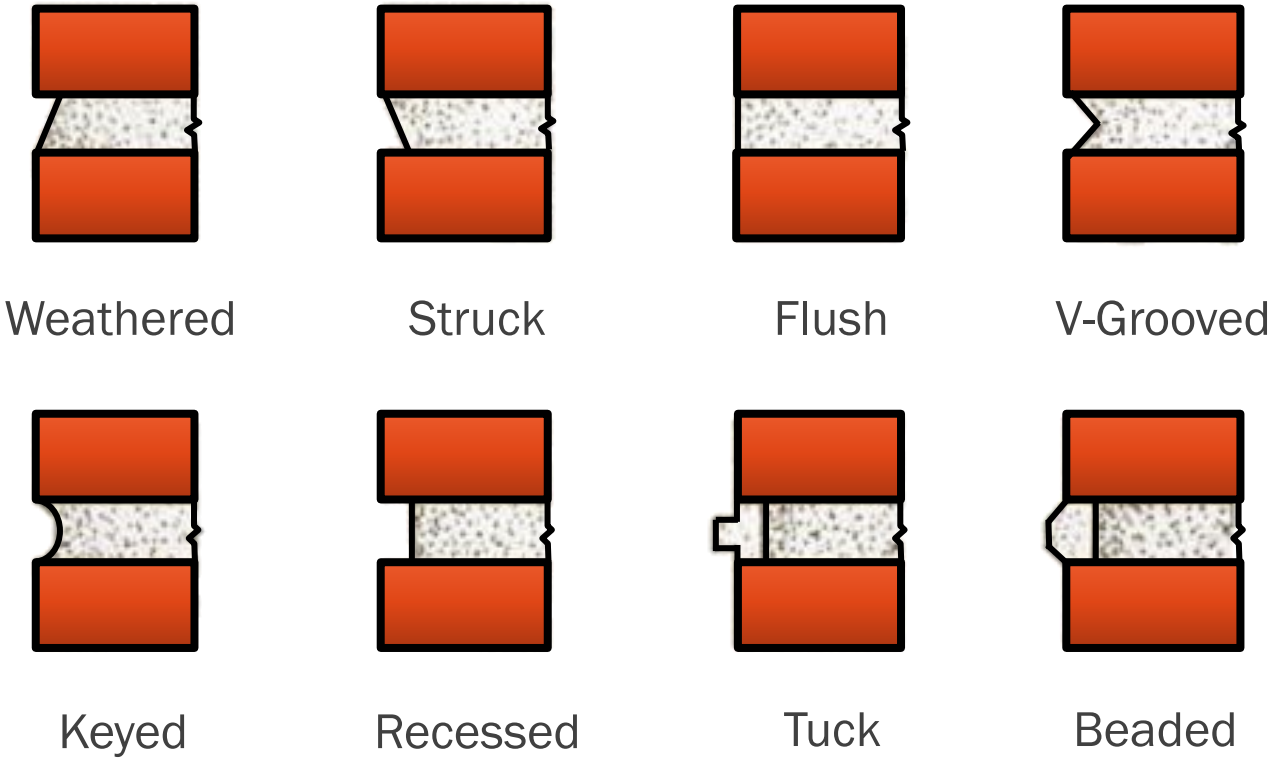
Bright Beaded Pointing

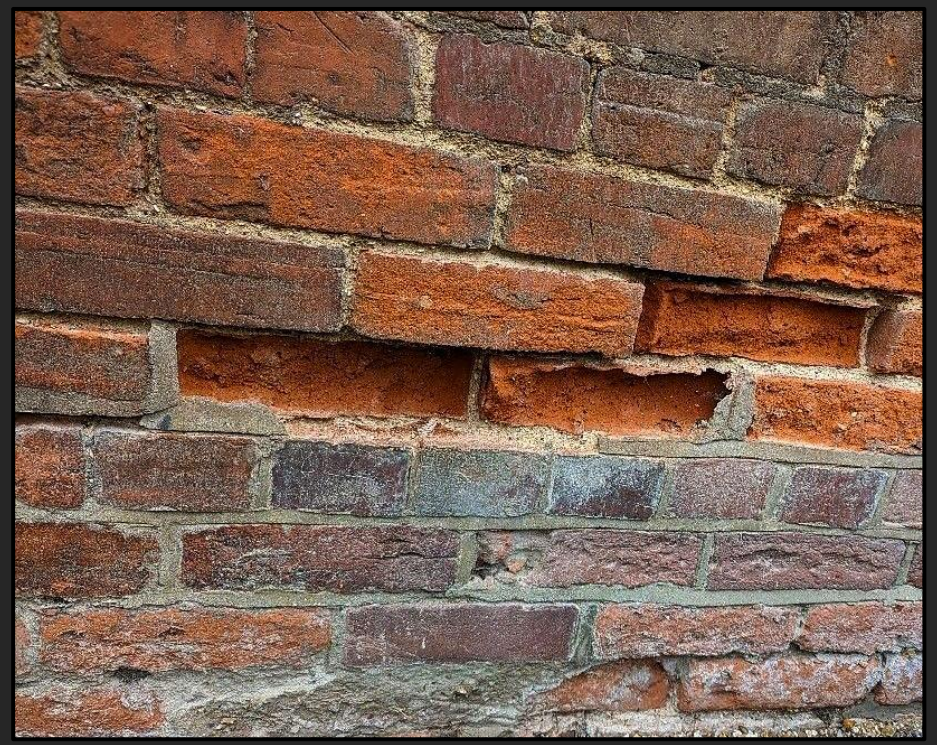
Dark Colored Raked Pointing

Angular Tuck Pointing

Soft Smooth Convex Pointing

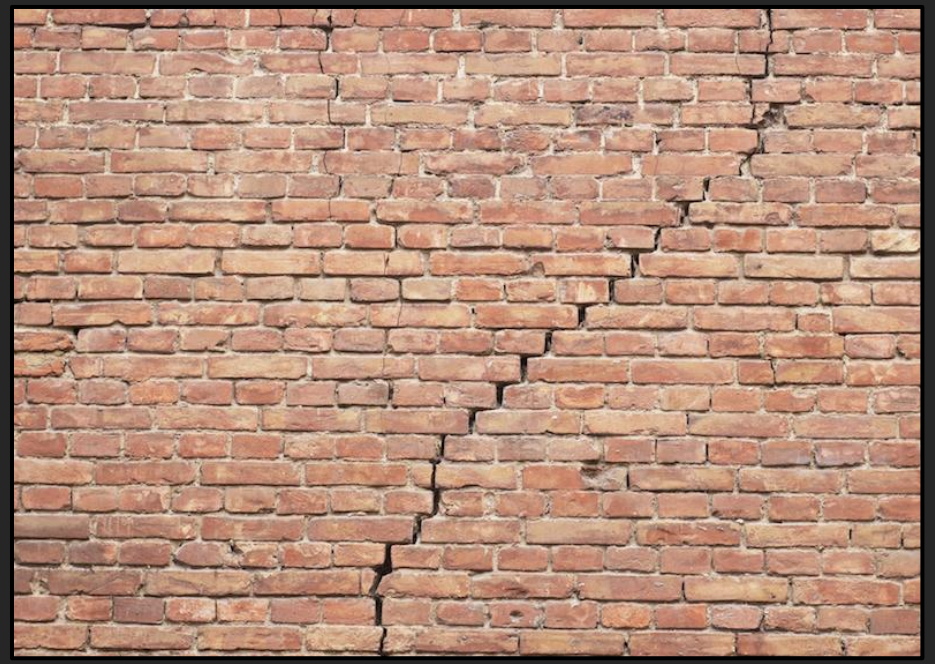
Mortar Pointing & Jointing





Recognizing the Signs that it's Time for Repointing

- **Crumbling or Missing Mortar**: If mortar is crumbling, loose, or missing more than ¼-inch of its original depth, repointing is necessary.
- **Dampness and Water Stains**: Interior dampness, crumbling plaster, water stains, or efflorescence (white salt deposits) on walls often signal moisture infiltration due to failed mortar joints.
- **Spalling or Loose Bricks:** When bricks begin to flake, pop off, or feel loose, it suggests the mortar has lost its structural support.



Recognizing the Signs that it's Time for Repointing

- **Weeds or Vines Growing Through Joints:** The presence of vegetation indicates long-standing gaps in the mortar, which should be addressed before they worsen.
- **Weathering and Discoloration**: Mortar joints that have faded, eroded, or changed color may be deteriorating and no longer effective.
- **Structural Issues**: Stair-step cracks, wall tilting, or visible movement may point to deeper foundation or structural problems that can be worsened by neglecting repointing.

Should I Paint my Historic Brick?

No.

Historic brick is meant to have space to breathe, where the sun can pull moisture from the mortar and preserve the life of the masonry. Paint can block that from happening, meaning that the mortar and bricks will begin to crumble as trapped water freezes.

If historic brick must be painted, a mineral-based breathable masonry paint should be used.

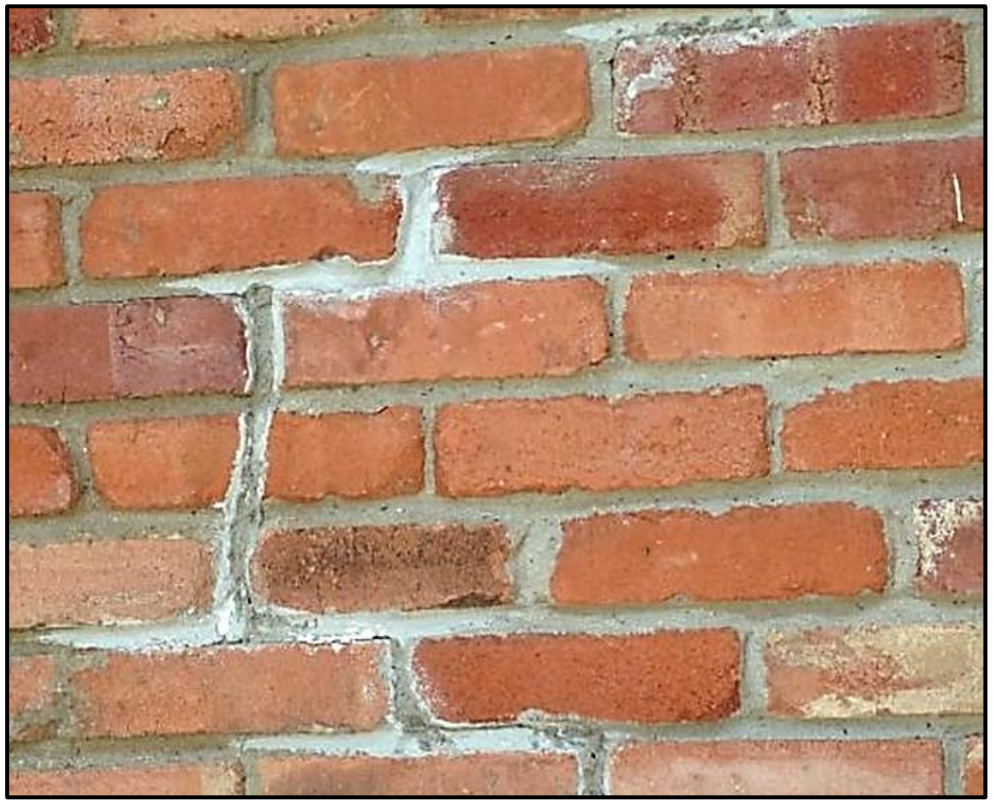
Painted Brick Is Vulnerable Brick

Matching Existing Mortar

Historic mortars are important to match in properties where possible. Mismatched mortars cause masonry to appear disunified and distract from the architecture's design.

Additionally, adding a new mortar to an existing wall will change the dynamics of water migration through that masonry. If the new mortar is harder than the existing bricks or mortar, damaging erosion will occur.

Matching existing mortar protects historic masonry and the historic environment's sense of character by providing cohesion.



Historic Mortar Lab Testing Available

Allows us to match:

- PSI properties
- Grain size
- Color and Texture

Masonry Repair Restoration and Repointing

In masonry, the mortar acts as the binder between the masonry units, but it also provides an outer layer of sacrificial material that allows for shock absorption, minor movement with seasonal temperature spikes, and moisture mitigation. Over time, mortar is slowly released from the exposed surfaces of historic masonry. Without proper maintenance, the walls will fail over time.

Mortar Types Matter

Shepherdstown's historic masonry was originally built with a ***softer brick*** than the bricks used in modern construction. Despite being made from more vulnerable materials, this historic masonry can last just as long when properly maintained with appropriate mortar mixes.

Modern mortar mixes rely on Portland cement to provide a strong, rigid grip on their modern, harder brick counterparts.

But historic masonry requires thoughtful mortar selection.

Mortar Mixes

Type N, Type O, and Type K mortars are the most appropriate for historic masonry restoration due to their lower compressive strength and flexibility.

Key Considerations For Historic Masonry:

Compatibility: Use a mortar softer than the masonry units to ensure deterioration occurs in the mortar, not the brick or stone.

Breathability: Lime-based mortars (like Type O and K) are more breathable than Portland cement mortars, allowing moisture to escape and preventing trapped water damage.

Avoid modern mortars: Type M and Type S mortars are too strong and rigid for historic structures, potentially causing spalling or cracking in softer masonry.

Matching the original: Repointing should match the original mortar's composition, color, texture, and performance—often requiring custom mixes based on analysis of existing mortar samples.

TYPE	STRENGTH	APPLICATION	USES	MIX RATIO	APPROPRIATENESS
M	2,500 PSI	Above & Below Grade	• Foundations • Retaining Walls • Heavy Loads • Sewers	1 : ¼ : 3 ¾ Portland: Lime: Sand	• Load-Bearing • High Strength • Low Flexibility • **Not for Repointing**
S	1,800 PSI	Above & Below Grade	• Structural Masonry • Foundation Walls • Retaining Walls • Paving	1 : ½ : 4 ½ Portland: Lime: Sand	• Load-Bearing • Strong Bond • High Wind Resistance • Can Match Original
N	750 PSI	Above Grade	• Exterior Walls • Brick Chimneys & Patios • Stone Veneer • General Masonry	1 : 1 : 6 Portland: Lime: Sand	• Non-Load-Bearing • Versatile • Good Flexibility • Modern Use
O	350 PSI	Above Grade	• Historic Masonry • Soft Brick Restoration • Interior Repairs • Decorative Work	1 : 2 : 9 Portland: Lime: Sand	• Non-Load-Bearing • Best for Soft Brick • Historic Repointing • Not for High Stress
K	75 PSI	Above Grade	• Historic Preservation • Fragile Brickwork • Decorative Masonry • Low-Stress Applications	1 : 3 : 10+ Portland: Lime: Sand	• Non-Load-Bearing • Very Soft • Delicate Restoration • Rarely Used

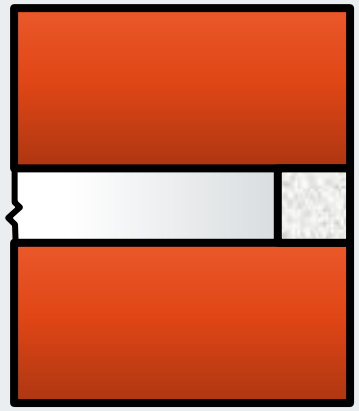
* Mix ratios are general guidelines and may vary by project specifications. Consult a professional for the exact requirements

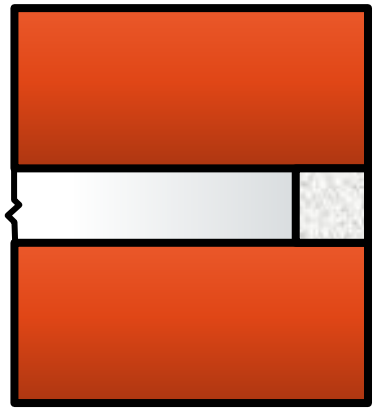
Flexible ***Lime-Based*** *Mortar*

Inflexible ***Cement-Based*** *Mortar*

Temperature

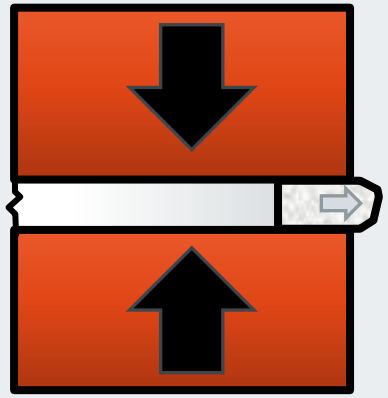
Normal

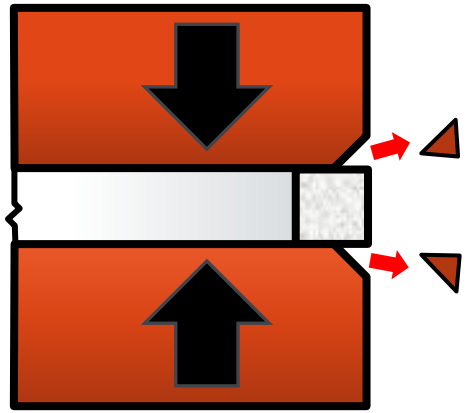




Hot (Bricks Expand)

Mortar Compresses

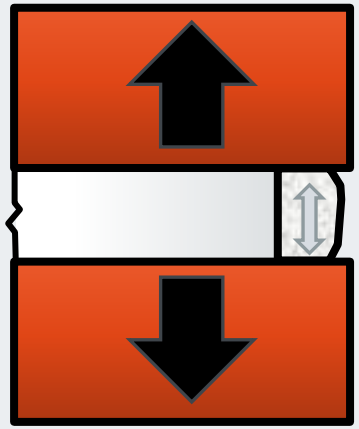


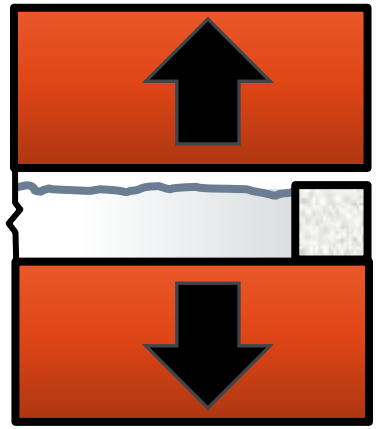


Spalling of Brick

Cold (Bricks Contract)

Mortar flexes



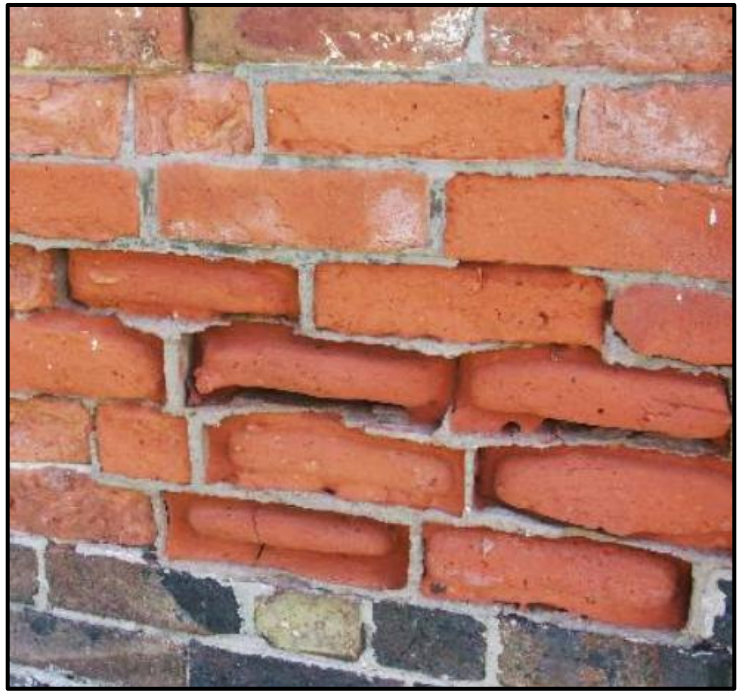


Cracks Open Up in Mortar

Too Strong means Trouble

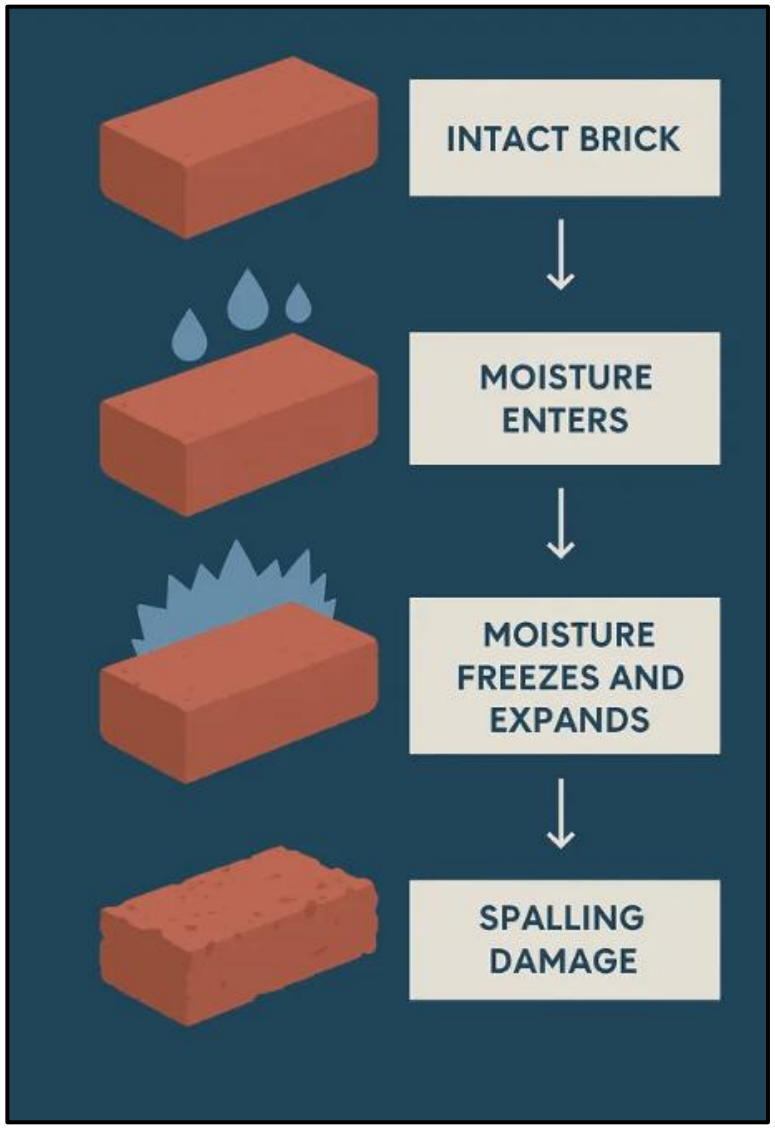
When the mortar is too hard, your bricks erode more quickly as water evaporates from the brick's surface rather than channeling out through the mortar.

It is a lot easier and more cost-effective to replace mortar than it is to replace brick.



Freeze Thaw Cycle Moisture infiltration

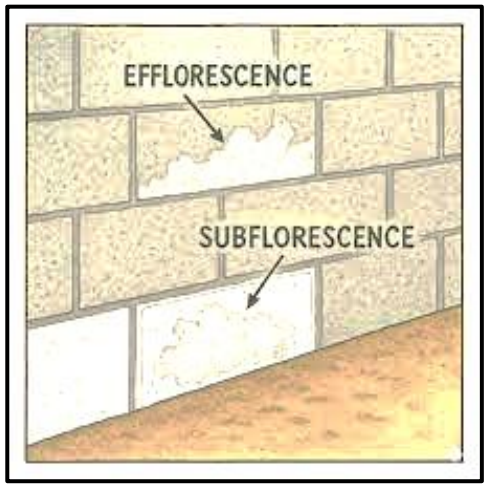
Water typically finds the path of least resistance. If the mortar is harder than the brick, water will travel through the brick. As this water freezes, it expands and will wreak havoc on the natural bonds within the brick. As these bonds break, the brick softens and begins to spall.



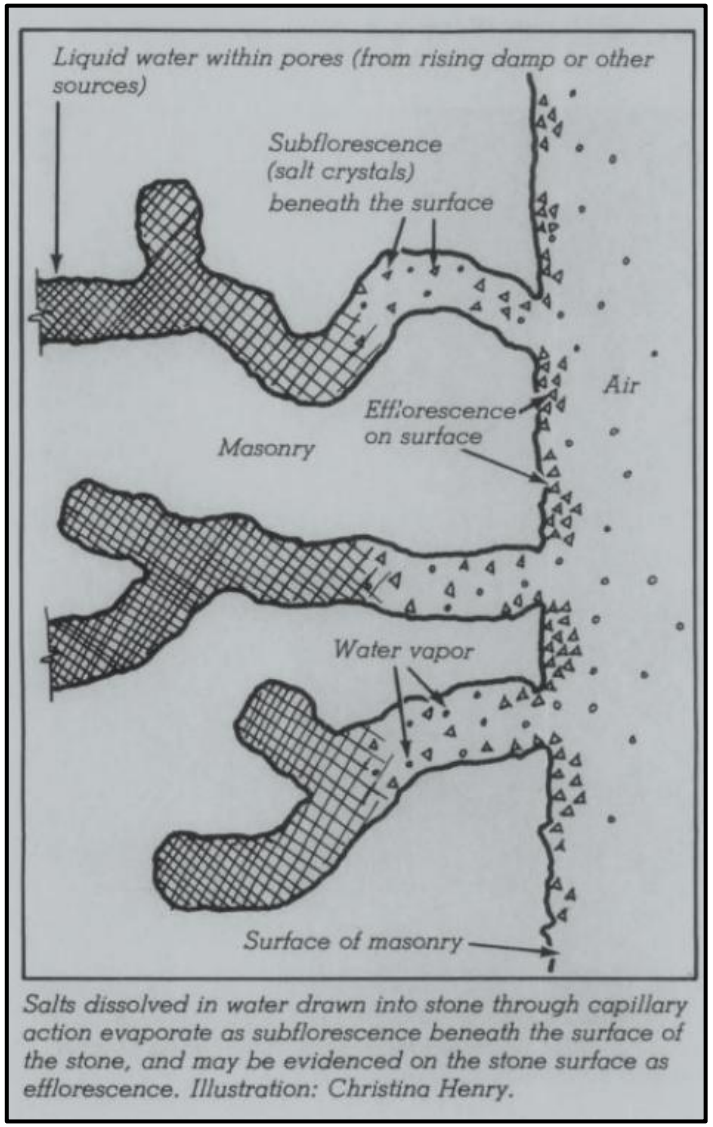
Salt Damage & Moisture Infiltration Makes Brick Vulnerable

With the use of deicing salts for pedestrian safety, masonry is particularly vulnerable to spalling salt damage.

Saltwater is absorbed and siphoned up into the bricks, where it slowly works its way out toward the surface, wearing down the brick's natural bonds and leaving it soft.



When salt is added to the freeze-thaw cycle of the colder seasons, salts dissolved in water are drawn up into the brick and mortar by capillary action. The water evaporates through the masonry's surface, thereby leaving the salts within the brick and mortar. This efflorescence or subflorescence builds over time and leaves the brick soft and vulnerable to ice, which causes spalling of the brick, destroying historic brick and requiring expensive brick replacement.



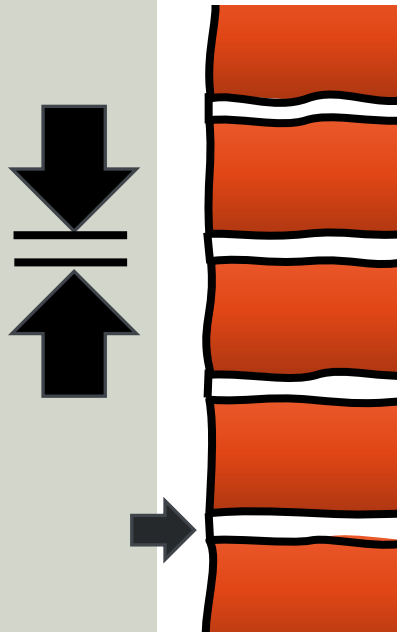
Salts dissolved in water drawn into stone through capillary action evaporate as subflorescence beneath the surface of the stone, and may be evidenced on the stone surface as efflorescence. Illustration: Christina Henry.

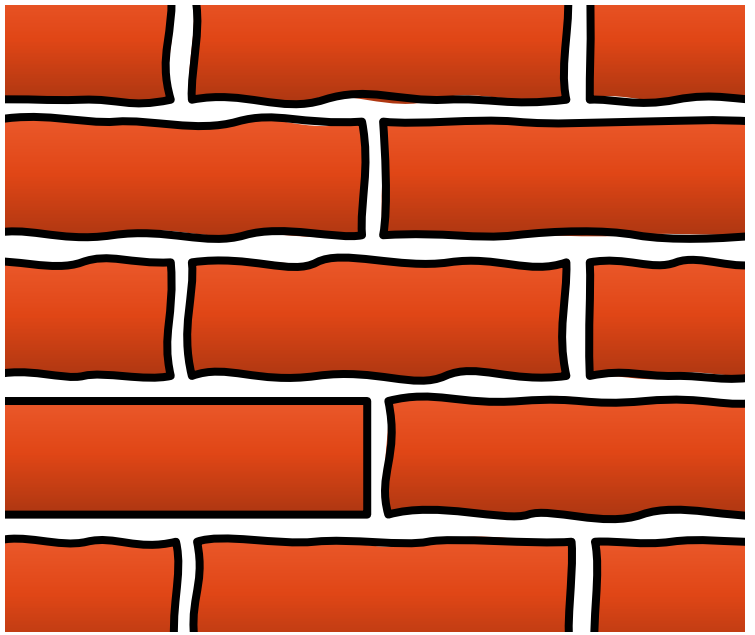
Preparation of Mortar Joints For Repointing

Incorrect

Joints Filled Too Full

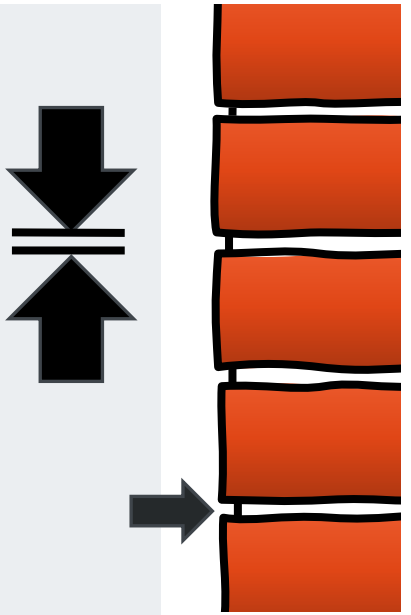
Wide Feather Edge Susceptible to Spalling

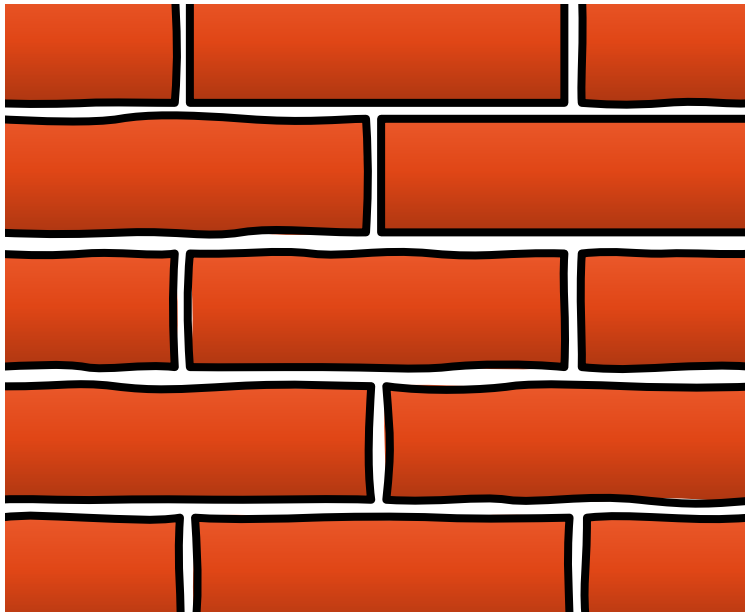




Correct

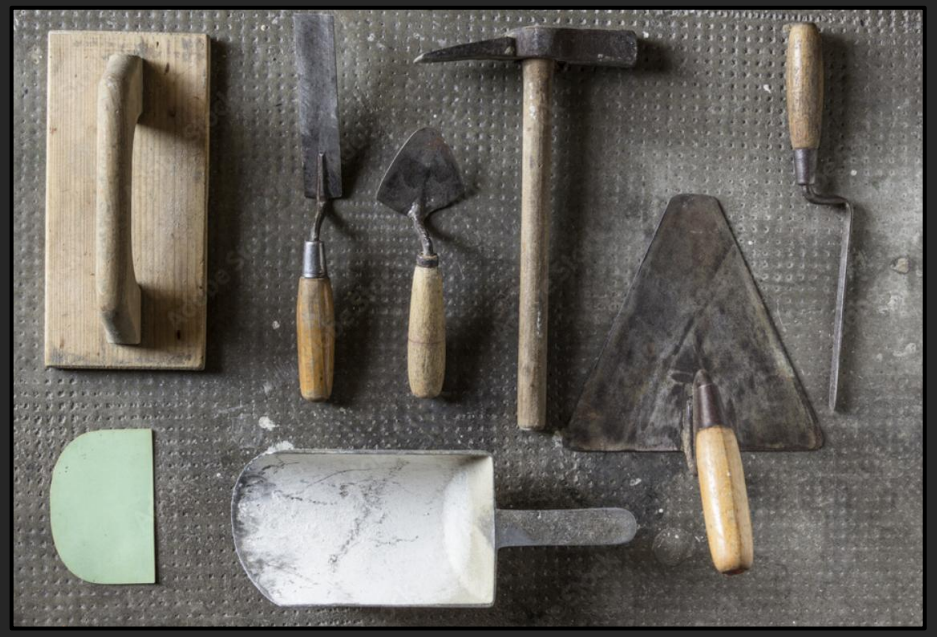
Joints Slightly Recessed

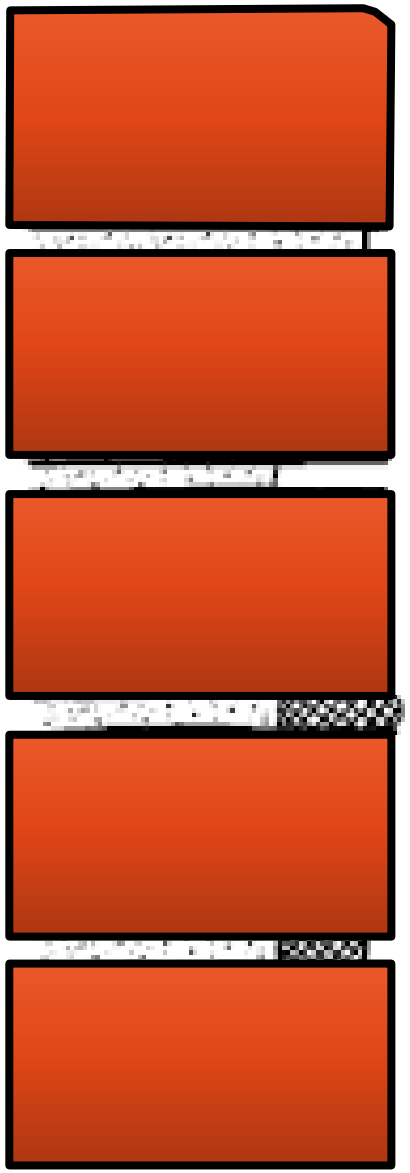




Steps of joint preparation

May require a conservation masonry professional to preserve historic masonry





Existing

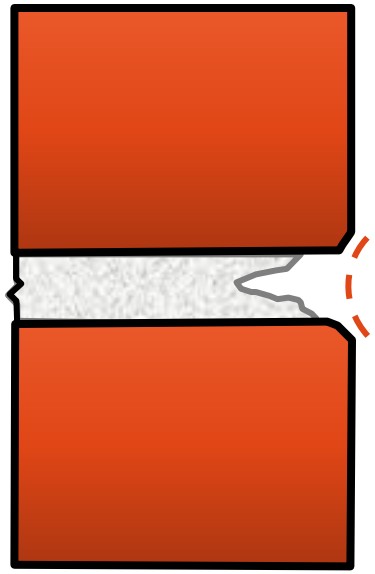
1. Remove

The mortar joint should be dug back to a depth of **2 to 2.5 times the width of the joint, or a minimum of ¾ inch (19 mm), whichever is greater.**

2. Fill

3. Repoint

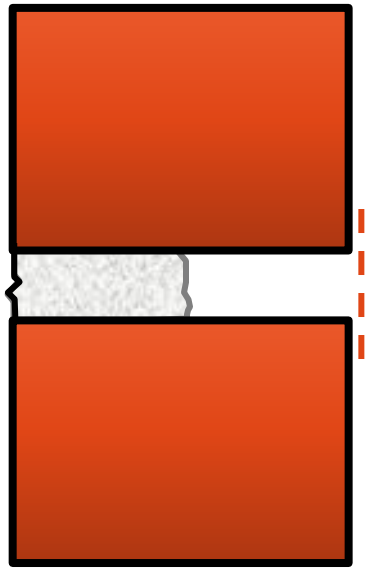
Masonry Joint Preparation Techniques



Incorrect

Mortar not cleaned out to a sufficient uniform depth.

Edges of brick damaged by tool or grinder. Creates wider joints.



Correct

Mortar cleaned out to a uniform depth (about 1” deep).

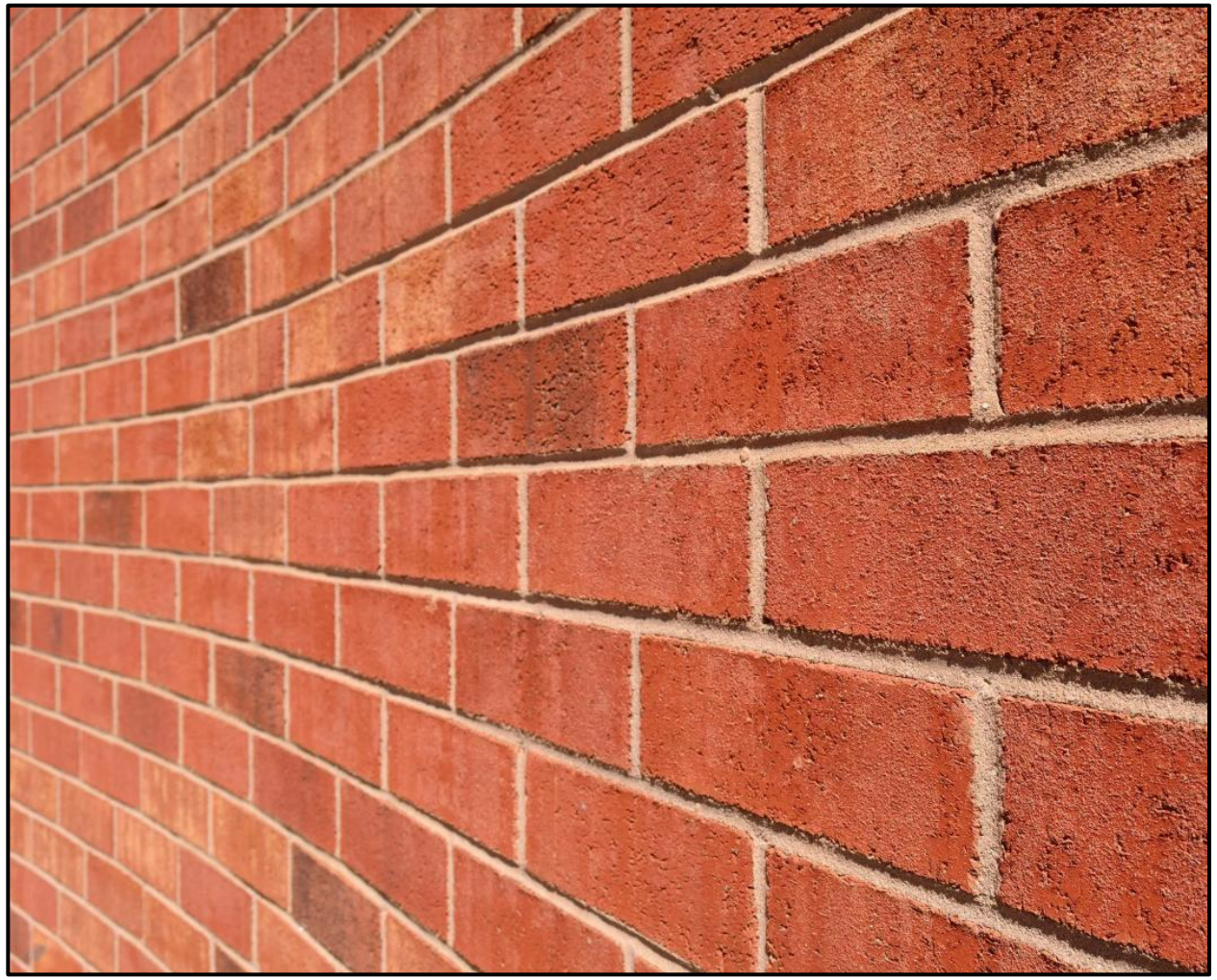
Careful Skill results in the flat, clean, undamaged edges of the brick.

Service Life Expectation

Good repointing of the N or O types should provide up to a

30-year service life.

If you protect your brick with proper maintenance, it will keep protecting you and your home.



Trusted Masonry Partners

List of contractors known for their work in historic masonry within the Shepherdstown region:

Raimondo (724) 837-3146

131 S. Lincoln Avenue, Greensburg, PA 15601

https://www.raimondo.com/

Greensburg Restoration (724) 244-0945

920 Towne Square Drive, Greensburg, PA 15601

https://www.gbgrestoration.com/

Allegheny Restoration Inc (412) 558-7179

1165 Garden St, Greensburg, PA

https://historicpreservation.com/historicspecs/alleghenyrestoration.html

Keystone Masonry Restoration (724) 834-2040

2008 Main Drive, Latrobe, PA 15650

https://www.keystonewaterproofing.com/

Patrick Godwin (304) 886-3858

Shepherdstown, WV 25443, PO Box 3053

*Please be aware that these are not fully vetted endorsements. Buyer beware. Please ask good questions and look at past client testimonials.