



# Mortar Repair

## A Guide for Historic Property Owners

Repairing mortar in a historic property presents unique challenges. Although repointing a historic structure may be a time-intensive and expensive project, taking the time and money to ensure your building is properly repointed ensures that your historic structure will remain physically strong and true to its original character. This guide aims to educate historic property owners about when mortar repairs are necessary, how to properly repoint their structures, and how to clean masonry.

### Definitions

- **Repointing**= The process of removing inappropriate or deteriorating mortar from the joints of brick or stone and replacing it with new mortar
- **Masonry**= Stone, brick, terra-cotta, and concrete block; historic masonry can be found on entire buildings or can be limited to areas such as chimneys and foundations
- **Tooling**= Compressing and shaping the face of a mortar joint with a special tool other than a trowel
- **Efflorescence**= Powdery white substance that may appear on masonry after soluble salts evaporate



*Successful repointing of a historic structure at Stagecoach Inn.*

### Signs Repointing is Necessary

#### Eroded mortar (1/4 inch or more)



*Photo taken in Downtown Round Rock.*

#### Crumbled mortar



*Crumbling cement layered over historic lime mortar. Photo from Historic England.*

#### Hairline cracks



*Photo taken in Downtown Round Rock.*

#### Masonry/mortar separation



*Broken bond between brick and mortar. Photo from Reddit.*

### What makes historic mortar different than modern mortars?

Historic mortar typically contains **more lime** and is **softer and more permeable** than modern mortar. These properties enable the mortar to adjust to building movement and allow excess moisture to exit a building through the mortar.

Until the early 20th century, most mortars used by masons were made of primarily lime and sand.

By the 1930s, most masons used a mix of Portland cement and lime putty, which had a shorter set time.

During and after the 1930s, more mortar options appeared, such as masonry cement and hydrated lime, which were pre-mixed options that saved masons time at the job site.

# Historic Mortar Repair: Step-by-Step

## Step 1: Cleaning Your Masonry (Pre-repointing)

Reasons for cleaning masonry:

- Improves the appearance of a building by removing unattractive dirt or soiling materials (such as soot, mildew, or ivy)
- Slows deterioration of a building by removing soiling materials
- Provides a clean surface to accurately match repointing mortars or patching compounds

Method:

- Cleansing should be done gently, typically with a brush and water or with low pressure water (<400psi)

## Step 2: Identify the Cause

*Identify the root cause of the mortar deterioration or the new mortar may become deteriorated just as the old mortar was.*

Common causes of deterioration:

- Time and weather
- Incompletely filled joints
- Mortar incompatible with the other building materials
- Differential building movement

## Step 3: Mortar Analysis & Selection

A mortar analysis helps ensure that the new mortar duplicates the original mortar on the historic building.

- A visual mortar analysis investigates the mortar's color, hardness, and permeability; an optional laboratory analysis provides more information about the original mortar's sand, water content, and cure time

The new mortar should:

- Match the **color and texture** of the historic mortar
- Have sand that **matches the sand** in the historic mortar
- Be **more vapor permeable** and **softer** than the masonry units
- Be **as vapor permeable** and **as soft or softer** than the historic mortar

## Step 4: Repointing

Proper repointing for historic buildings restores the visual and physical integrity of the historic structure.

*Tip: if 25-50% of a wall needs repointing, it may be more cost effective to repoint a whole wall than to spot repoint.*

Repointing conditions:

- Wall temperatures between 40°F-95°F prevent the water in the mortar from freezing or excessively evaporating
- Ideally, repointing should be done in the shade, such as that provided by scaffolding, to slow the setting of the mortar

Joint preparation:

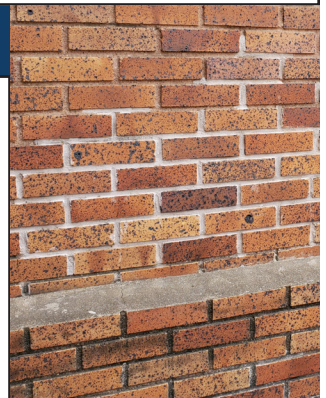
- Old mortar should be removed to a minimum depth of 2 to 2-1/2 times the width of the joint to ensure an adequate bond
- Any loose or disintegrated mortar beyond this minimum depth should be removed
- Though more labor intensive, removing mortar with hand tools generally results in far less damage to the masonry

Joint filling:

- When filling, joints should be damp but with no standing water present
- Where existing mortar has been removed to a depth >1 inch, those deeper areas should be filled first
- Several layers of mortar will be necessary to fill deep gaps, and the mortar must dry between each layer
- For bricks or stones with worn, rounded edges, recess the final layer of mortar slightly from the face of the masonry to avoid the mortar being physically wider than the actual joint

Joint tooling:

- Joints should be tooled to the original profile, especially when only portions of the masonry are being repointed
- Failure to match tooling depth and mortar width between old and new sections can result in a prominent distinction



*Bad mortar visual match. Photo taken in Downtown Round Rock.*



*Poorly matched tooling depth. Photo from Sanders & Magness, 2007.*



## Step 5: Cleaning the masonry (Post-repointing)

- **1-2 hours** after repointing: any mortar that has dried on the masonry can be cleaned with water and a stiff natural bristle or nylon brush
- **~ 30 days** after repointing: freshly repointed masonry should be fully dried, but only very low pressure (100 psi) water, combined with a stiff natural bristle or nylon brush, should be used
- **A few months** after repointing: efflorescence occasionally appears and usually goes away naturally with the weathering process. A water and brush may be used to clean the masonry

### Mortar Repair at Stagecoach Inn



*Clockwise, from upper left: before mortar repair and cleaning; joint preparation; after filling and tooling; finished building.*

### Reading List

- Historic Savannah Foundation. (2010). Guide to Common Repairs for Historic Buildings. Savannah, GA; Historic Savannah Foundation.
- Mack, R. C., & Grimmer, A. (2000, November). Preservation brief 1: Assessing cleaning and water-repellant treatments. National Park Service. <https://www.nps.gov/orgs/1739/upload/preservation-brief-01-cleaning-masonry.pdf>
- Mack, R. C., & Speweik, J. P. (1998, October). Preservation brief 2: Repointing mortar joints in historic masonry. National Park Service. <https://home.nps.gov/orgs/1739/upload/preservation-brief-02-repointing.pdf>
- Pickles, D., Henry, A., Stewart, J., & McCaig, I. (2017, January). Repointing Brick and Stone Walls: Guidelines for Best Practice. Historic England. <https://historicengland.org.uk/images-books/publications/repointing-brick-and-stone-walls/heag144-repointing-brick-and-stone-walls/>
- Sanders, A. L., & Magness, K. (2007). Brick Maintenance and Repair for Historic Landmark Structures. Journal of Architectural Technology, 24(1), 1–8. <https://www.hoffarch.com/wp-content/uploads/FINAL-BRICK-JOURNAL.pdf>

**Contact Planning and Development Services (PDS) at 512-218-5428 for any additional questions about proper repointing. Be prepared to provide mortar samples to PDS prior to commencing work.**