

# PRESERVATION NEWSLETTER

## MAINTAINING HISTORIC MASONRY

Masonry buildings can be some of the sturdiest ones around; but nothing will last forever without a little TLC. Like most historic materials, brick is resilient and can be repaired, but before jumping into DIY repair or maintenance projects it's important to understand your historic masonry. Continuing on from our last newsletter where we explored the basics of historic brick construction and design, in this issue, we will focus on common maintenance issues and methods for repair of historic masonry. First, read on for a quick recap of the information covered in our last newsletter...

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## MASONRY 101: RECAP

**1. *Brick has been around forever.*** The first evidence of brick construction dates back to 7500 BC when shaped mud bricks were sun dried until ready to use. Over time, the brick making process evolved to include placing the dried bricks into a hot kiln, firing and hardening the outside of the brick, and making it much more durable. The rise of the industrial era and increased mechanization made it possible to form bricks by extruding clay through a die into a very dense, consistent shape which could then be cut down into smaller, more regularly sized, bricks.

**2. *Brick laying is an art.*** Brick bonds, mortar color, and finishing are just some of the places where the skill of bricklaying can be displayed. Even though it is often a byproduct of structural stability, bonding can also be used deliberately to create unique designs. Typical bonds include Flemish, English, American, and running bonds and can all be used for subtle or striking brick exteriors depending on the artistry of the bricklaying and color choices. Another variation in brick construction is in the finishing of the mortar joints. Mortar can come in nearly any color and be decoratively tooled for added emphasis to the brick or stone exterior. Common mortar joints include concave joints, raked joints, and beaded joints.

**3. *Brick and mortar should be compatible.*** As a rule, mortar should always be the weaker part of a brick wall as the lower density of the mortar will allow the bricks to expand and contract naturally and without damage. Early brick construction used a very soft lime mortar which would wash away over time. Advancements in the 19<sup>th</sup> century, namely the use of Portland cement, allowed masons to create a harder, more durable mortar. However, when used with soft historic brick, the harder Portland mortar impedes the natural movement and processes of historic brick construction, creating more issues and often irreparable damage to the brick. Eventually advancements in brick making made bricks harder, allowing for the use of Portland mortar with less risk of damage to the modern brick.

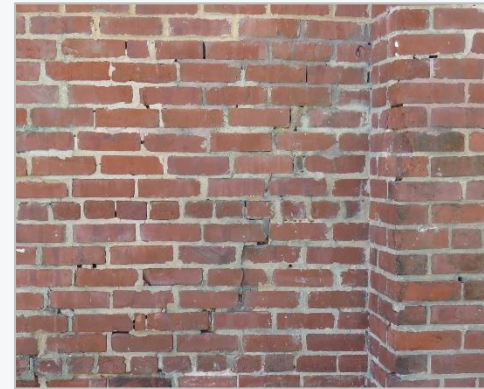
# GETTING TO KNOW YOUR MASONRY

Preventative maintenance is key to avoiding costly repairs to any building. You may consider hiring a preservation expert to conduct a baseline evaluation of your building to locate and address already existing concerns and ensure that potential problems do not worsen over time.

**1. *Inspect the condition of your masonry regularly.*** Getting to know your masonry building means knowing its current condition and noting when things change. Like all elements of a building, masonry construction and architectural elements need regular maintenance and care to stay in top form. More often than not, preventative maintenance will help avoid costly repairs down the road. Even if you don't have a brick building, you may find brick or some form of masonry on your chimney or foundation; these elements should be checked annually. Developing a maintenance plan can also allow you to catch problems early. If you would like to learn more about maintenance plans, check out NPS Preservation Brief 47: Maintaining the Exterior of Small and Medium Size Historic Buildings.

**2. *Water and masonry construction don't mix!*** Many issues seen on masonry buildings (or any building) can be tracked back to water. Brick in regular contact with water can grow unwanted plant life and even lead to serious deterioration. Are your gutters clogged? Are trees or bushes growing too close to your foundation? Have you been leaving a window air conditioning unit in the window year round? These are just a few of the possible culprits for your problems. Trapped moisture can cause spalling (more on that later), mortar deterioration, and even structural issues. Tracking down the source of the water and making proper repairs to address and prevent further water infiltration is key for long term maintenance of masonry buildings.

**3. *Not all cracks should cause alarm.*** Cracks in masonry can mean a number of things. Some cracks, like stair step cracks, may indicate the settling of the building and may have been present on the building for decades. Noting the size of the crack and checking to see if it increases over time can tell you if the crack is active. Active cracks, ones increasing in size over time, should be evaluated by a professional to find the source of the issue. Fairly often cracks on older masonry buildings are stable and can be repointed, filling in the gap with mortar (to prevent that pesky water infiltration!). Other cracks to note are cracks that go through the brick rather than the mortar. This can indicate that the mortar is harder than the brick and therefore incompatible. When in doubt be sure to call a professional, such as a structural engineer, with experience in historic masonry to evaluate your building. Remember- catching issues early can prevent costly repairs in the future!



*Mortar deterioration is common over time but should be addressed through repointing gaps with compatible mortar to prevent water infiltration.*



*Over time, the mortar on this building has washed away almost entirely. On the right side of the photo, a poor repair is visible. Not only is the color incorrect, the mortar is too hard and has caused the brick to crack.*



*Cracks should be monitored to ensure that they are not caused by ongoing movement of the building. Active movement and expanding cracks should be evaluated by a structural engineer.*

# PRECARIOUS PAINT

A recent trend in TV driven home renovation in the last few years has involved painting brick. Designers tag it as an easy DIY method of brightening up your home and improving its curb appeal. However, many of our historic district guidelines do not allow for previously unpainted masonry to be painted; it is also a discouraged practice in national standards for historic preservation, but why is that? While altering the visual qualities of a building is a concern within historic districts, painting brick can also lead to serious long-term issues for the building.

A primary goal of our local historic districts is to retain the historic fabric of the district. A key component to the historic fabric of any district is the historic material that makes up the structures within that district. As discussed in our last newsletter, brick bonding, color, and mortar joints can be used deliberately to create a certain appearance; different brick bonds and colors are often also used differently depending on the architectural style of the building—making the brick itself a key character defining feature. Painting brick compromises the integrity of a historic building by concealing the deliberate design decisions related to the brick and mortar.

Painting brick also creates additional maintenance issues. Not only do you have to continue to paint the building for the rest of its existence, but paint can also lead to unintentional maintenance issues related to trapped moisture. Natural processes of brick construction include the evaporation of water out of the brick and mortar. Covering over brick and mortar with an impervious surface treatment can prevent moisture from leaving the brick. Over time, this can cause **spalling**, when the surface of masonry peels, flakes or pops off. While this creates an unsightly appearance that is difficult to repair, the deterioration of the brick and trapped moisture can also eventually lead to structural issues.



Deliberate brick details such as brick color and decorative bond patterns can be completely obscured by painting brick; Altering historic character is one of the reasons painting brick is not recommended for historic buildings.



Trapped moisture in this brick has caused spalling of the brick to the point where many of the bricks have turned to dust behind the paint. More brick deterioration may be unseen behind the intact paint.

## OTHER WAYS TO FRESHEN UP YOUR HOME

### *1. Repaint trim, doors, and other wood features.*

Painting wood windows, trim, and doors is part of routine maintenance that should be completed on a regular basis in order to maintain a historic home. A fresh coat of paint on trim alone can give a property a whole new life—at a fraction of the cost and without the harmful effects of painting brick.

### *2. Consider freshening up your landscaping.*

Landscaping is one of the most DIY friendly projects out there and for residential structures, it does not require design review or permits, as long as it is on your property! Clemson has a plant database that can help you choose the right plants for your yard.\*

### *3. Clean the brick—using appropriate methods.*

Simply cleaning dirty brick can give you a fresh look. Removing soil, mold, mildew, and moss, the most common contributors to dirty looking brick, can be removed with gentle means, such as water from your garden hose! Talk about a budget friendly project! Read on for masonry cleaning tips and tricks...

\*You can access Clemson's database here:  
<https://www.clemson.edu/extension/carolinayards/plant-database/index.html>



# CLEANING HISTORIC MASONRY

Before diving into general recommendations for cleaning and repairing brick and other masonry, let us start with a cautionary tale. Hundreds of miles from Columbia, there was a brick building built in 1870. This beautiful eclectic Second Empire structure was beginning to grow too small for the University campus it sits on, so the University decided to add on to the structure; brick was chosen for the addition to match the existing structure. Several decades later, the entire building was cleaned of dirt and debris. With this cleaning, it was discovered that the brick that was selected for the addition did not match the original brick, by several shades! This costly—and embarrassing—mistake is still visible today.

When done correctly, cleaning can improve the overall appearance of a building, prevent deterioration, and provide a clean surface to accurately match new brick, assess condition, and repoint mortar. However, improper cleaning techniques can also cause harm to masonry surfaces. Below we will discuss whether your project is DIY or if you should hire an expert.



*The mismatched brick discovered after building was cleaned; Photo by Richinstead.*



*Mold, mildew, and other organic growth can be caused by a variety of problems. While cleaning will temporarily remove the problem, it does not get to the root cause. Be sure to address the source of the issue.*

## *1. Dirt, fungus, mold, and moss.*

No organic material should be growing on masonry surfaces. Removing these common soiling agents from brick and other masonry is often as simple as washing them away with a garden hose (at about 100 psi or below), no other treatments needed. Where the pressure of a garden hose is not enough, consider increasing the pressure slightly, but do not go higher than 300-400 psi. If areas of dirt and buildup remain, use a natural or synthetic bristle brush with water to clean these areas. Do **not** use a metal brush as it can damage the surface of brick and other masonry. Metal bristles will also leave behind deposits that stain. If you are not satisfied with the result, stop here and call the experts.

## *2. Ivy and other crawling vines*

Removing ivy is more challenging than you might expect. Pulling on the living plant can leave the tendrils and aerial roots behind. Instead of pulling on the vine, which also leaves the potential for dislodging mortar, cut the vine at the base of the wall and allow it to die. Once the vines are dead, it should be able to be removed with relative ease. Once you have removed all the ivy from the building, do not forget about the root!

## *3. Paint, oil, and metallic stains*

Removal of paint, oil, or metallic stains should likely be done by a professional, as these stains and coatings can not be removed easily and are likely to require harsher treatment. Always consult with preservation staff before signing a contract as certain treatments, such as sandblasting (which damages the masonry beneath), are not permitted. Others may be allowed on a trial basis, with approval by staff after seeing a test area.

**Before beginning masonry cleaning, please be sure to contact preservation staff to be sure that your plans are compliant with guidelines for your district. Staff may request a site visit to assess the condition of the masonry.**

# REPOINTING AND REPLACING HISTORIC MASONRY

A common issue with brick masonry is missing or deteriorating mortar. Brick construction is designed for mortar to be the softer, sacrificial element; which means that over time, as the building moves and water escapes the building through the mortar, it will slowly wash away. So what should you do if you notice deteriorated mortar? After talking with preservation staff, consult a contractor experienced in working with historic masonry. If repairs are done incorrectly, they can cause further damage to the historic masonry- brick and mortar repair is not recommended as a DIY project!

**Repointing historic brick takes experience and care.** In our [last newsletter](#) we warned of the overuse of Portland cement in modern mortar when used with historic brick. Replacement mortar should match the historic material in color, texture, tooling, softness, sand composition, and have comparable vapor permeability. Matching these items will ensure that the match is not only visually correct, but that it also allows the brick to breathe, expand, and contract without causing cracking. An experienced professional should be able to test and analyze the original mortar to find the best match for the repointing project.

**Bricks may also require repair and replacement over time.** As previously discussed, brick can be damaged through improper repair, incompatible mortar, or through trapped moisture. Damaged bricks can be replaced by cutting them out (carefully) from a wall. This takes great skill as incorrectly cutting out the brick can cause additional damage to other bricks through saw nicks. If the face of a brick is damaged, the brick can sometimes be turned around so the back of the brick faces outward- ensuring that the brick color matches the rest of the wall. Matching brick can also be found as there are numerous companies throughout the country that specialize in producing brick to replicate historic brick.

**Before beginning masonry repair projects, please contact preservation staff to be sure that your plans are compliant with guidelines for your district. Staff may request a site visit to assess the condition of the masonry. Remember- catching and addressing issues early can prevent costlier repairs in the future!**

## FURTHER READING

Be sure to check out our other masonry newsletter, **Masonry 101: A Beginners Guide**, to learn more about the basics of masonry construction: [https://www.columbiasc.net/depts/planning-preservation/docs/preservation/07\\_PreservationNewsletter\\_Masonry101.pdf](https://www.columbiasc.net/depts/planning-preservation/docs/preservation/07_PreservationNewsletter_Masonry101.pdf)

For more on historic masonry, check out some of these great online resources:

- **NPS Preservation Brief 1: Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings:** <https://www.nps.gov/tps/how-to-preserve/briefs/1-cleaning-water-repellent.htm>
- **NPS Preservation Brief 2: Repointing Mortar Joints in Historic Masonry Buildings:** <https://www.nps.gov/tps/how-to-preserve/briefs/2-repoint-mortar-joints.htm>
- **Historic Fredericksburg Foundation: Brick and Mortar:** <https://hffi.org/brick-and-mortar/>
- **City of New Orleans Guidelines for Masonry and Stucco:** [http://www.nola.gov/hdlc/documents/07\\_masonry-stucco-2015-04-24/](http://www.nola.gov/hdlc/documents/07_masonry-stucco-2015-04-24/)



We Are Columbia

This newsletter was created by the Preservation Staff of the City of Columbia's Planning and Development Services Department. If you have any questions about your specific historic property please contact your district's preservation planner. Contact information can be found on our [website](#). If you would like to be added to our newsletter mailing list please send an email to [preservation@columbiasc.gov](mailto:preservation@columbiasc.gov).