

PRESERVATION NEWSLETTER

MASONRY 101: A BEGINNERS GUIDE

Masonry comes in many forms; stone, terra-cotta, and concrete are all forms of masonry that can be found on historic buildings locally. In this newsletter, we will focus on the most common form of historic masonry around, **brick!** We will take a look at the history of brick and the many, many variations that can be found in brick buildings. Even if your historic property does not have brick exterior walls, chances are you'll find brick in your foundation or chimney. Read on to learn more about this versatile material.

This is the first installment in a two part series about masonry. In our next newsletter we will take a closer look at preventative maintenance and cleaning for masonry structures.

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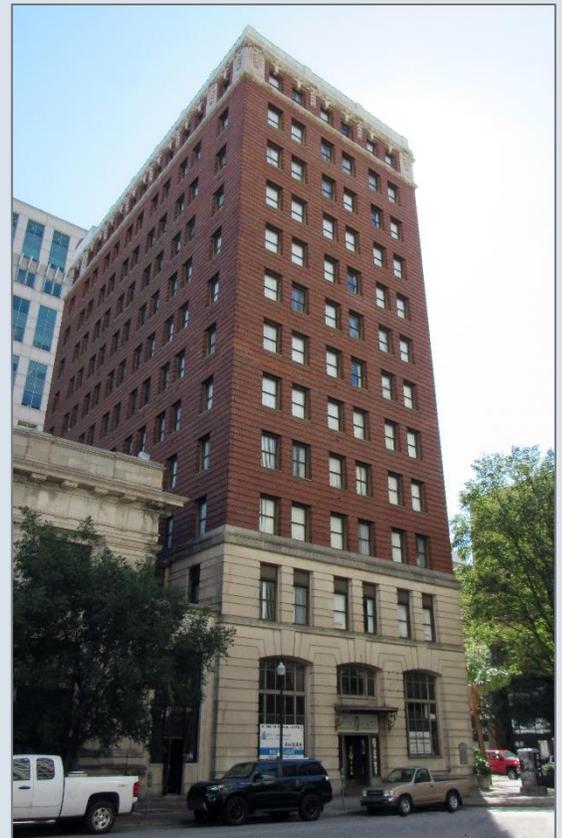
BRICK THROUGH THE AGES

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. When South Carolina's earliest brick structures were built, the kiln fired method would have been used to produce hand formed bricks from local clay.

In 19th century South Carolina, this work was often done by the local enslaved population. Rose Hill Plantation, a state historic site about 65 miles northwest of Columbia, recently found the fingerprints of a slave in one of the bricks on the former plantation. You can read more about that story [here](#). With the rise of the industrial era and increased mechanization, it became possible to form bricks mechanically by extruding clay through a die into a very dense, consistent shape which could be cut down, using tensioned wires, into smaller bricks. This wire cutting method often left distinctive drag marks that can be seen on the finished brick.

Here in the Columbia area, Guignard Brick Works, just on the other side of the Gervais Street bridge, began producing bricks as early as 1801. The family suspended brick making activities after the Civil War, but resumed production in the late 1880s and, by 1891, they were producing over two million bricks per year. Many of these went on to serve as part of Columbia's best known historic structures including the Richland, Granby, Olympia, and Capital City Mills.

As brick production became increasingly mechanized, it became more durable and affordable than its 19th century counterpart. These factors caused a rise in the usage of brick as an applied material in residential construction. Think of neighborhoods like Cottontown or Melrose Heights with their relatively large number of brick structures compared to slightly older neighborhoods like Elmwood Park.



Guignard brick was also used in the construction of the National Loan and Exchange Bank Building, Columbia's first skyscraper.

BRICK BONDS AND DECORATIVE COURSING

There is a great deal of room for artistry and skill in traditional brick laying. Although they can be subtle, bond patterns, mortar color and finishing are just some of the places where the skill of bricklaying can be displayed. Bonding is the arrangement of bricks to create structural stability. Even though it is often a byproduct of structural stability, bonding can also be used deliberately to create unique designs. Below are examples of bond patterns and course work, some of which can be found in Columbia.

HEADERS, STRETCHERS, SOLDIERS AND SAILORS

Part of how brick bonds are created involves utilizing the different faces of brick. Headers, the smallest face laid horizontally, and stretchers, the long, narrow face laid horizontally, are the most common. They are shortly followed in common use by soldiers, the long, narrow face laid vertically (often seen as a decorative element above windows), and sailors, the long, wide face laid vertically. Less common are shiners, the long, wide face laid horizontally, and rowlocks, the smallest face of the brick laid vertically.



Stretcher Course



Shiner Course



Header Course



Rowlock Course



Soldier Course



Sailor Course

1. Flemish Bond

One of the more intricate bond patterns, bricks are laid alternating between exposed headers and stretchers. This pattern is often punctuated with a variety of colors or the use of glazed headers. Flemish bond is a traditional pattern that is one of the most stable for brick construction.

2. English Bond

English bond features alternating rows of headers and stretchers. Commonly used in 17th and 18th century construction. This bond tends to be less ornate than the Flemish bond but is still strong enough for use in structural brick work.

3. Common Bond

Not as structurally strong as its Flemish and English predecessors, the Common bond, also known as American bond, primarily utilizes the stretcher face of brick with every 5th, 6th, or 7th course made up entirely of headers. This bond eventually replaced the English bond in early American construction.

4. Running Bond

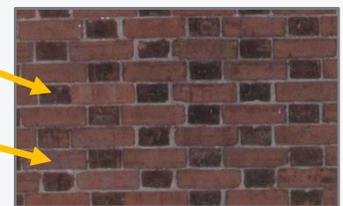
One of the most common patterns, running bond is made up entirely of stretchers with alternating seams. This bond was traditionally used in non-structural applications and has been used since the early 20th century in veneers.

5. Stack Bond

Only used in brick veneer, stack bond utilizes stretchers that are, as the name suggests, stacked directly on top of one another. Commonly used in mid-century architecture, stack bond is not a structural bond and is often used as a decorative accent.

Glazed Header

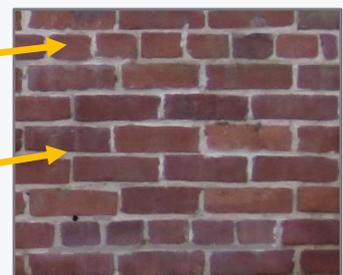
Stretcher



Flemish Bond with glazed headers in the Vista

Header Course

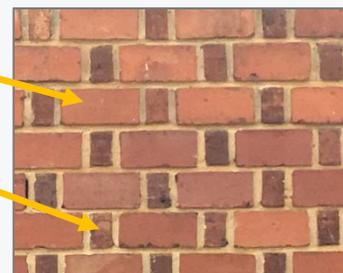
Stretcher Course



Common/American Bond in Granby

Shiner

Rowlock



Flemish bond, seen on a home in Cottontown

MORTAR AND JOINT PROFILES

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. In early American brick construction, mortar was very soft as it was a mixture of lime and aggregate, typically sand and would wash away overtime. The 19th century brought advancements in materials available for mortar and brick, one of which was the creation of Portland cement, allowing 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.

PORTLAND CEMENT

First patented in England by Joseph Aspdin in 1824, its name is derived from its resemblance to limestone from the Isle of Portland. When mixed with water, it creates a chemical reaction that results in an extremely hard material. Although patented much earlier in Great Britain, it was not manufactured in the United States until 1872. Until the mid 20th century, mortar was typically a mixture including Portland cement, in varying quantities. Today, it is used as the primary, if not the only, ingredient in mortar.

Another area of variation in brick construction is in the finishing of the mortar joints. There is a great deal of variety in these joints and below are just a few of the more popular finishes. The image to the right shows the joint profiles in the same order, top to bottom, in which they are listed below.

1. Concave

This type of joint is created with the use of a curved tool; the use of the tool compacts the mortar, making it one of the more water resistant joint profiles.

2. V-Joint

The V-joint is a like a concave joint but is created with a V shaped jointer or trowel.

3. Weathered

In this joint, mortar is increasingly recessed from bottom to top and is used to emphasize horizontal joints.

4. Struck

The opposite of the weathered joint, a struck joint is recessed at the bottom and flush at the top; also used to emphasize horizontal joints.

5. Raked

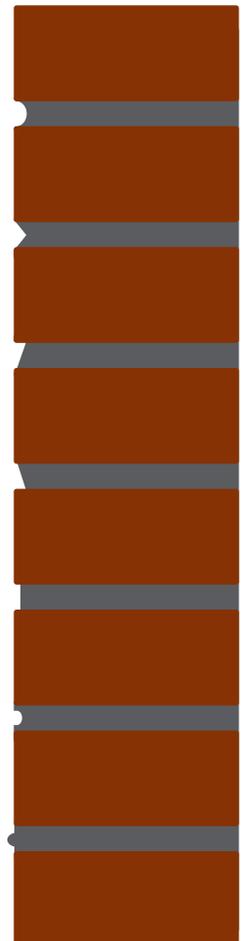
Created by raking out the mortar to a consistent depth, it results in a highly emphasized joint.

6. Grapevine

Created using a grapevine jointer, this profile has an indented line in the center of the joint, which is otherwise relatively flush; the jointer creates lines that are rough and wavy, simulating the slightly irregular appearance of a grapevine..

7. Beaded

Like the grapevine joint, beaded joints result in a central line in the joint that is raised, rather than recessed; this joint is commonly used to emphasize stone masonry.



FUN FACTS

Mortar comes in more than just gray...

While most homes feature mortar in shades of gray or tan, mortar can come in nearly any color. This variation can be used to create distinctive finishes.

Mortar and Pencils

In addition to adding a distinctive mortar color, joints can be further accented by adding a white line composed of iron oxide and linseed oil. This was a common technique in the 18th and 19th century used in conjunction with a redwash on the brick as a way to hide the rough edges of handmade brick. Utilizing the redwash gave the porous handmade bricks a degree of waterproofing, while the penciling redefined and emphasized the mortar joints.

What do babies and brickwork have common?

Diapers! Diaper brick work is a pattern that is originally found on Gothic styles and in revival on Tudors. The highly decorative pattern is a diamond or lozenge, shape achieved by using different color or protruding bricks and can be achieved with a variety of bonds.

Clinker Bricks

Called clinkers because of the sound they make when they hit one another, historically these were the scraps of brick making which occurred when wet bricks were placed too close the fire in the kiln. The twisted and highly varied colored bricks became popular in the early 20th century within the Arts & Crafts movement and continued to be used throughout the 20th century. As the brick making process has become increasingly mechanized, these bricks have become increasingly rare.

Decorative Masonry

There are many other forms of masonry used locally. Commonly seen as decorative embellishment on residential and commercial buildings, stone can be found inlaid in brick chimneys, walls, or used as window sills in many local historic neighborhoods. Terracotta, literally translated to “cooked earth”, is another form of masonry made from clay that can be used to create highly ornamental building facades.

Sawtooth Brick

Sawtooth brick, like diaper brick work, is a decorative pattern. In this design, bricks are laid at an angle, creating a regular, zig zag pattern. Sawtooth pattern can often be found at the top of commercial buildings or along roof lines. Sawtooth brick can be found locally on commercial buildings in the Vista.



Although highly deteriorated today, the historic mortar was originally colored to match the brick



This Tudor Revival Style house in Melrose Heights uses brick diapering and colored bricks for a highly decorative effect



This decorative colored terracotta façade is all that remains of this historic Main Street building



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.