

# **BRICK** ARCHITECTURE

From the Brick Industry Association



## Specialty Retail Districts

### INSIDE THIS ISSUE:

Read the newest technical discussion on *Crafting Space with Brickwork* and earn one AIA/CES credit hour.

The article explains how to:

1. Articulate the role of brick in crafting space and community.
2. Understand the role of brick in historic and contemporary retail space.
3. Craft and detail brickwork to create space.





# Brick Design Unifies Streetscape While Diversifying Individual Retail Stores

The Ballantyne Complex in Charlotte, North Carolina is a mixed-use development consisting of office buildings, a resort, and shopping outlets, but owners had plans to add another 150,000 square feet of retail shops, high-end restaurants, a movie theater, and office spaces named Ballantyne Village. Two high-rise towers of offices, retail, and condominium space are also slated for future development.

For this new addition, ai DESIGN GROUP proposed the creation of a town center and central plaza along a cozy boulevard. The owners wanted a neotraditional look incorporating landmark architectural features not typically found in local shopping venues. However, because a majority of the complex was already in place, Ballantyne Village needed to respond appropriately to its existing context.

As plans evolved, so did the aesthetic. An Art Deco design theme emerged, where a variety of brick accents and patterns bring the motif to life. Also, the variation of field brick colors helped to break up the long façades as well as contributed to the diversity of the project.

“Using brick as the basic element of the façade was a natural decision,” explains project architect John Weller, AIA. “We wanted to make the façades varied enough from each other to get that Main Street feel. We didn’t want a monotonous, recurring pattern, but we did want a unifying element. Brick tied everything together and gave us an historical reference back to Main Street.”

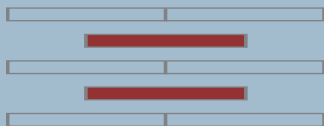
The design team also wanted to reinforce the Main Street concept by providing a wider variety of storefront options that would allow individual retailers to express their branding within the framework of the brick façades.

Explains Weller, “Many of our retail tenants have established looks that they use in their stores, so the team responded by creating a book of design guidelines establishing what the retailer could and could not do within the architectural framework. Some businesses wanted to use banners. Others wanted awnings. We gave tenants a variety of style and color options to illustrate how they could incorporate their branding into the design of the building. The advantage of being the first tenant is that you can choose the features you want. The next tenant has to select a different style. This allows the retailers to identify their domain, but it also lends a level of liveliness to the whole project.”

Brick contributes to the overall look and feel of Ballantyne Village, even down to the sidewalks. “Our plans started out with just a typical concrete sidewalk, but the owner decided that he wanted pavers,” recalls Weller. “We incorporated the pavers, and they really highlight the brick patterning in the buildings. The pavers better define the outdoor eating areas and give an interesting visual pattern for those viewing the streetscape from above on the theater patio.”

Concludes Weller, “Using brick in this project allowed us to distinguish each tenant’s façade from their neighbor while unifying the streetscape. Brick is a wonderful product that can be detailed in many ways to enhance a project.” ■

An Art Deco motif is brought to life through a variety of brick accents and patterns. The variation of field brick colors helps break up the long façades as well as contributes to the diversity of the project.



# Ballantyne Village — Charlotte, North Carolina



**Architectural Firm:**

ai DESIGN GROUP

**Principal:**

John Weller, AIA

**Photographer:**

Tim Buchman Photography

**Brick Manufacturers:**

Glen-Gery Corporation

Lee Brick & Tile Company

Cunningham Brick Company

Palmetto Brick Company

As verified by architect



# Main Street-Style Brick Architecture Attracts Residents and Visitors to Crocker Park

Westlake, Ohio has become a fast-developing suburb of Cleveland, but as it grew, it failed to produce a city center or a sense of cohesiveness. However, with plans to develop Crocker Park, the owners tasked Bialosky + Partners Architects with the design of an ambitious and synergistic mixed-use development. The client wanted a high-quality, new-urbanist environment where people would feel comfortable living, working, and shopping.

With more than 1.2 million square feet of ground-floor retail and commercial space incorporating upper-level office and residential spaces, Crocker Park has emerged as a vertically-integrated, planned urban development.

As part of new urbanism, its street grid patterning is designed to give both residents and visitors choices as they move throughout the development. It hearkens back to the Main Street-style communities of the early 20th century when people walked to their destinations as an aesthetically and socially enjoyable pastime.

Explains architect Jack Bialosky, Jr., AIA, "Crocker Park is all about the pedestrian. Cars are allowed, but pedestrians have the right of way. People can park at one end of the development, do their shopping, go to the theater, go to dinner, come out at the other end, and have a valet bring their car down to them. It creates a downtown for the city of Westlake that didn't really exist before."

As a conservative community, Westlake residents requested that an historic aspect was contained in the new development. The design architects wanted to be sympathetic to the traditional context but also recognized the need to provide a modern expression. Incorporating brick throughout Crocker Park, therefore, became the natural choice because of its sustainability, durability, and aesthetic flexibility.

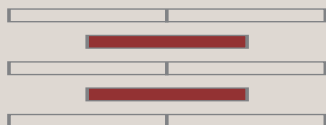
Brick was used both externally and internally to tie the mixed-use development together. Colors and textures were expressed through a variety of bricks and tinted mortars in order to create distinct separations in building function and tenant space. Brick also helped define the overall project massing and allowed the buildings to exist on the human scale.

"Since bricks are individual units, they can be combined in an array of patterns and forms. Very few large, uninterrupted planes of brick exist in Crocker Park because they are generally broken up by details like diaper and basketweave patterns, corbelling, jack arches, or recessed belt courses. These types of elements break down the scale of the buildings because people who walk by can clearly see and relate to the size of the individual bricks," explains Bialosky.

In addition, recycled clay pavers were used to easily identify upcoming intersections and to texturally slow vehicular traffic. As the retail and residential spaces continue to grow, this eclectic environment will continue to pique the interest of residents and visitors.

Concludes Bialosky, "As we build Phase II and beyond, we will continue to use brick not only because it is one of our favorite materials, but also because it is the very element that defines Crocker Park. People here have come to expect it." ■

Colors and textures were expressed through a variety of bricks and tinted mortars in order to create distinct separations in building function and tenant space.



Crocker Park — Westlake, Ohio



**Architectural Firm:**  
Bialosky + Partners Architects

**Principal:**  
Jack Alan Bialosky, Jr.

**Photographer:**  
Scott Pease

**Brick Manufacturers:**  
The Belden Brick Company  
Glen-Gery Corporation

**Brick Distributor:**  
Forbes Brick Company

As verified by architect



# Hillshire Village Complex Unified with Traditional Craftsmanship and Detailed Brickwork

When the Hillshire Village complex in Houston, Texas was being developed, the owners sought enhanced aesthetics and long-lasting materials for the building façades. The goal was to visually anchor the complex as a fixture in the community. At the same time, company executives wanted the new building to appear as if it had been established for years. Utilizing old-style craftsmanship and detailed brickwork were the keys to achieving these goals.

Hillshire Village is comprised of a large grocery store as well as two retail spaces—one freestanding and one that abuts the main building on the left. At approximately 96,000 total square feet, a column-supported structural canopy spans the front of each of the buildings, visually unifying the complex.

With the growing prevalence of oversized town centers, this project more closely resembles a traditional neighborhood shopping outlet. Located in a long-established, dense residential area, little space exists for additional retail venues.

Many of the surrounding houses and historic business districts are built with masonry, so the use of brick in Hillshire Village was a natural choice for the designers at CDA Architects. Selecting this cladding material allowed the new construction to blend with the existing surroundings. The architects studied nearby historic business districts and drew inspiration from many of their traditional details as well.

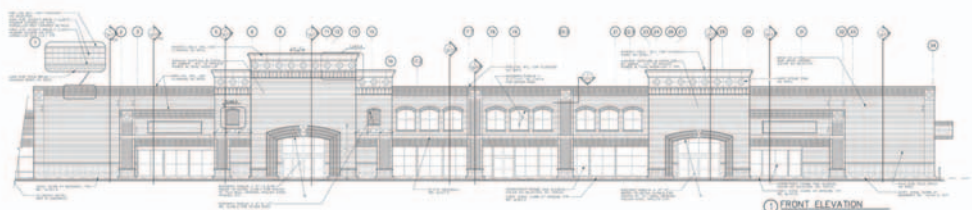
Explains architect Ray Duerer, AIA, “We didn’t want to create an island. One of our goals was to blend in with and draw customers from the surrounding neighborhoods. From a customer relations perspective, we wanted them to feel at home with this new complex.”

The color of brick used on the store façades is a break from traditional red brick and includes several hues, including dark beige field bricks, lighter beige accent bricks, and special 8 x 8 chocolate-colored bricks that appear in the wainscoting. The watertable directly above the wainscot is a combination of two specially-shaped radius bricks, where the lower brick course is inverted to create a full bull nose effect.

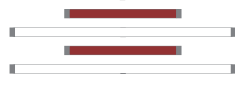
Other unique details include corbelled soldier courses accenting spandrel brickwork between columns with a herringbone pattern recessed into the columns. Along the top of the façades, however, an entablature featuring an eleven-course-high brick architrave supports frieze and cornice elements above. The brick architrave mimics an enlarged egg-and-dart detail completed on a colossal scale with standard brick units.

Duerer concludes, “When it was first built, Hillshire Village definitely did not look like anything else that was being built in that area at the time because of the level of craftsmanship put into it. And now seven years later, it’s still one of the nicest facilities in the area. It’s been a big draw to the residents and has served the community well.” ■

Unique details include corbelled soldier courses accenting spandrel brickwork between columns with a herringbone pattern recessed into the columns.



Hillshire Village — Houston, Texas



**Architectural Firm:**  
CDA Architects

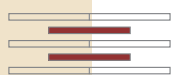
**Project Architect:**  
Ray Duerer, AIA

**Photographer:**  
CDA Architects

**Brick Manufacturers:**  
Acme Brick  
Richtex Brick

**Brick Distributor:**  
Upchurch Kimbrough Company

As verified by architect





# Brick Design in Whole Foods Market Conveys Company's Organic Message

When Whole Foods Market moved to open a store in the Dupont Circle neighborhood of Washington, D.C., one of the goals that company executives presented to the architects of Mushinsky Voelzke Associates / MV+A was to create a building that was not only reflective of the surrounding community but also one that reaches out to its residents.

For this project, the chosen site was located on a long-neglected block with many commercial and industrial buildings that were either demolished or in a state of deterioration. Leading the effort to redesign the public space, Whole Foods Market was the first business to move into the area. In doing so, they set out to be the anchor of the neighborhood and become a catalyst for future development.

While there was no existing contextual reference, the neighborhood did have a history of masonry buildings. The architects wanted to continue that pattern of development but provide a fresh interpretation.

Explains architect James Voelzke, AIA, "We wanted this building to look like it had been established in the neighborhood and to reflect the development that occurred in the previous 100 years. Brick was the natural choice because of the surrounding environment. There is also the connotation that brick is solid, permanent, and around for the long term, which is what we wanted this store to be."

The building is an exercise in yin and yang dialogues: horizontal and vertical, solid and void. The street façade combines a strong horizontal box that defines the store mass with substantial vertical columns and tall windows that not only mark the entrance but also invite pedestrian views deep into

the store. The transparency of these windows balances the solid and void aspects that are accompanied by the use of intense, heavy brick detailing.

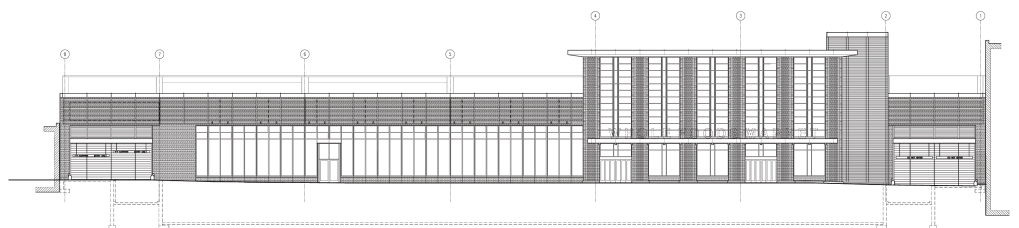
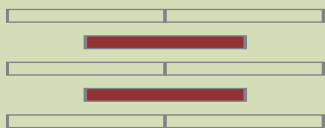
The walls themselves play off the heavy texturing in the individual brick units. Just as brick is textured on the smallest scale, the macro scale of the building integrates texture with projections, recesses, and different patternings of the bricks themselves.

Brick plays a pivotal role in integrating the structure with the neighborhood, and takes center stage in new Whole Foods Market locations as the company moves towards "green" building.

Explains Voelzke, "The company is telling us that their buildings need to have architectural integrity, look real, and be natural. And brick gives all of this. It's a natural product that also gives the structures better energy efficiency and durability."

Six years after the completion of the Whole Foods Market in Dupont Circle, the entire neighborhood has changed. Where there was nothing before, the project served as a catalyst for the surrounding new development. A vibrant urban environment now exists with Whole Foods Market continuing to be the anchor and draw of the neighborhood. ■

Brick was the natural choice because of the surrounding environment. There is the connotation that brick is solid, permanent, and around for the long term, which is what we wanted this store to be.





# Whole Foods Market — Washington, D.C.



**Architectural Firm:**

Mushinsky Voelzke Associates / MV+A

**Principal:**

James Voelzke, AIA

**Contractor & Mason:**

L.F. Jennings

**Photographer:**

Dan Cunningham

**Brick Manufacturer:**

The Belden Brick Company

**Brick Distributor:**

Potomac Valley Brick & Supply Company

As verified by architect



Use the following learning objectives to focus your study of the technical article below. To receive one AIA/CES credit hour, turn to the back page and follow the instructions.

### Learning Objectives

After reading this article, you should be able to:

1. Articulate the role of brick in crafting space and community.
2. Understand the role of brick in historic and contemporary retail space.
3. Craft and detail brickwork to create space.

*One of the prime purposes of architecture is to heighten the drama of living. Therefore, architecture must provide differentiated spaces for different activities, and it must articulate them in such a way that the emotional content of the particular act of living which takes place in them is reinforced.*

*Architectural forms, textures, materials, modulation of light and shade, and color all combine to inject a quality or spirit that articulates space.*

*The quality of the architecture will be determined by the skill of the designer in using and relating these elements, both in the interior spaces and in the spaces around the buildings.*

—Edmund Bacon

Winston Churchill once said, “We build our cities first with words and then with bricks.” Whether speaking in metaphor or in fact, he chose brick to represent the built environment around us. Brick not only defines a building’s exterior but also the spaces surrounding it. When applied with care by architects and designers, brickwork can infuse a space to arouse one’s senses and emotions in both landscape and building applications to create place.

This issue of *Brick in Architecture* will focus on how brickwork can influence a space and its participants. Particular emphasis will be given to retail spaces—their evolution and the role played by brick.

### EVOLUTION OF RETAIL

The evolution of retail in the United States began in towns and villages where people congregated and lived. They had a need for goods and services, and specialized retailers were there to meet this need. Many of those needs were met by the early American Main Street.

### Main Street U.S.A.

At the turn of the 20<sup>th</sup> century, Main Street was the place for people to work, shop, and play. Parades, festivals, public meetings, services, places of worship, and stores were within walking distance. Main Streets were engaging and pedestrian-focused, fulfilling the need for community and social interaction. Individuals were drawn to the Main Street as places that create a sense of community. Many of the buildings were brick and featured unique detailing. The distinct architectural character provided by every brick structure allowed each to stand on its own while the brickwork as a whole unified the space into a cohesive place.

### Beyond Main Street

While Main Street retailers of the 1920s faced a limited fight for consumers, the 1940s brought increased competition. Mass production of the automobile and highway development meant longer distances could be traversed with ease. New

residential development began moving to the outskirts of town bringing with it the demand for nearby retail establishments.

As the relocation of retailers from Main Street began, the Country Club Plaza in Kansas City, Missouri was built as the first automobile-friendly shopping district in 1922. J.C. Nichols envisioned an upscale shopping experience encompassing 15 blocks with centrally located, easily accessible parking. The Country Club Plaza is renowned for its 1920’s Spanish architecture, fountains, and sculptures. The use of buff-colored brick and artistic brick detailing serves as a unifying building element throughout the Plaza and helps to create a sense of place and a feeling of permanence that has contributed to the ongoing success of Kansas City’s premier urban space.

Responding to increases in population and consumer needs, the first indoor shopping mall was constructed in 1956 in Edina, Minnesota. Fully enclosed with climate control, Southdale was designed to bring retailers and services together, creating an enclosed space that mimicked many of the services offered by Main Streets. Malls were overbuilt in the 1980s and 1990s, and the variety of retailers operating in today’s market has heightened competition for the traditional shopping mall. Today, the majority of shopping malls in the U.S. are between 15 and 20 years old, many poorly maintained and in decline.

In the 1960s through the 1980s, the number of roadside retail strips dressed in metal panels increased. Many Main Street retailers attempted to “modernize” their stores with these and other products, often covering exterior brickwork. Ironically, years later, the federal Main Street Assistance program focused on removing such materials to restore their original brickwork. At the same time, the National Trust for Historic Preservation is similarly dedicated to saving historic places and revitalizing America’s communities.

Yet another retail trend emerged in the 1970s. Pedestrian malls opened in downtown areas throughout the country in an attempt to mimic the shopping mall. They did not meet with much success, and in the 1980s and 1990s regional shopping malls and power centers began to thrive. Power centers typically resemble open-air malls and include three or more big-box retailers accompanied by a variety of smaller retail stores.

### Main Street in the 21<sup>st</sup> Century

Americans now have more disposable income than ever before and increasingly choose to spend it on leisure and recreational activities. Many of today’s consumers have lost interest in shopping malls and power centers which provide a less stimulating experience than Main Street. Instead, they are turning to other alternatives that offer a sense of place.

Specialty retail districts are one alternative that have become a destination in their own right. Providing a mix of Main Street elements with an emphasis on pedestrian-friendly public spaces, such places offer consumers a more unpredictable, spontaneous experience. Many are designed as a traditional Main Street but include a combination of anchor facilities, such as an arts cinema or bookstore. A mix of retail spaces that reinforce each other and restaurants with unique dining opportunities combine to create a distinctive experience for patrons. From a design perspective, such developments are composed of high density/floor area ratios, small to zero setbacks along streets, a mix of land uses, and limit parking to on-street or rear parking garages. Most centers have or are near high-density offices, housing, and lodging.

One type of specialty retail district is the lifestyle retail center (lifestyle center), which often appeals to a specific interest of consumers, such as upscale fashion or sports. Lifestyle centers are typically 50,000 square feet, but a number of similar developments are much larger and offer a wide range of services. Nationally, there were over 120 lifestyle centers in 2005, and studies show that although consumers spend less time at lifestyle centers, their average sales are higher than at shopping malls. Lifestyle centers are also frequented more often

than other shopping venues, tying into today's consumer preferences. As the trend for specialty retail districts grows, the success of lifestyle retail centers will depend on the quality of place perceived by consumers in a development—and Main Street is the measuring stick.

### Brick's Role in Contemporary Retail

Although brickwork used in today's Main Street developments has an historical component, the scale it affords a building provides more interest to passers-by. An individual brick is one of the smallest building materials available; consequently, brick can be manipulated within brickwork in a number of ways to create interest. Brickwork also helps to divide the mass of building elements to minimize the overall size of a development or building. Brick provides a coherent element in storefront façades, thereby tying an entire community together. The natural warmth and muted tones of brick also serve to enhance this connection.

### CRAFTING SPACE WITH BRICKWORK

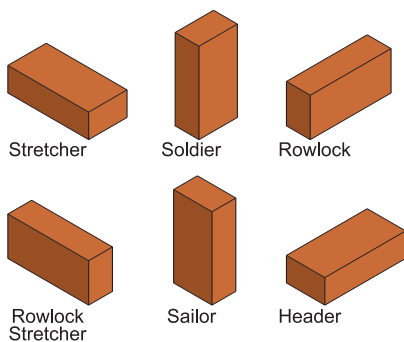
Brickwork is uniquely qualified to give shape to a space. Since each brick is laid in place one at a time, there exists the opportunity to build details into a wall on a small scale—by projecting or recessing courses, adding soldier or rowlock segments or courses, or even by choosing to alter the mortar joint. On a larger scale, panels of brickwork laid in a different pattern can add character by breaking up a façade.

### Common Brick Positions in a Wall

When discussing brick details, an understanding of brick positions is useful. A brick has three dimensions (width, height, and length). Two of these three dimensions make up the sides of each of the six faces of the brick. A particular face can be laid in two positions such that either the shorter or longer dimension is laid horizontally. Since on a typical brick, faces which are parallel with each other are essentially the same, there are six possible brick positions in the wall as shown in Figure 1.

Placing brick or brick courses in various positions can add interest to brickwork. Knowing these common positions is also helpful when discussing brick bond patterns.

Brick does not have to be placed with a flat side parallel to the wall face. Laying brick at 45 degrees to the face of the wall, with the corner of the brick in the outside plane, creates a wall with additional shadow and appearance of depth.



**Figure 1.** Brick Positions in a Wall

### Bond Patterns

Most contemporary brick walls are constructed as a single wythe (layer) of brick veneer bearing only its own weight. Structural bond patterns associated with thicker multi-wythe, load-bearing brick masonry walls are sometimes used in contemporary brick veneer to add character to a wall. This is accomplished by using header bricks to create the bond pattern but cutting them in half to keep them within the single-veneer brick wythe.

## BRICK—SOLID BENEFITS

Beyond a material's ability to influence a space, designers need to consider how a material can contribute to the health, safety, and welfare issues of their projects. Below are some of the benefits offered by brick.

### Community Fiscal Health

Communities built with brick are more fiscally-sound. In a recent study conducted by the Taubman College of Architecture and Urban Planning at the University of Michigan, the fiscal revenue-generating performance of communities was examined. Some communities had adopted a masonry ordinance, requiring a certain percentage of masonry exterior in buildings, while others had not. The study concluded that the communities with masonry ordinances attracted more retail customers, increased the competitiveness of local business, and generated more sales revenue or rental income for commercial properties.

### Fire Resistance

Wall assemblies with brick veneer have superior fire resistance. In a recent study conducted by BIA at the Southwest Research Institute, three load-bearing brick veneer wall assemblies with brick veneer each achieved a one-hour fire resistance rating. Each brick veneer was constructed of hollow brick, with thicknesses of 3 1/2 in., 2 7/8 in. and 1 3/4 in. Only the thickest of these bricks has a one-hour fire resistance rating by itself. Building codes may require exterior wall surfaces to meet a one-hour fire resistance rating based on the building's occupancy classification and the distance from the wall to the property line.

### Impact Resistance

Brick veneer has superior impact resistance and exceeds Florida's impact resistance requirements for essential facilities constructed in hurricane areas and for houses constructed in high velocity hurricane zones. In a recent test conducted by BIA at the Wind Science and Engineering Research Center at Texas Tech University, a medium-sized wind-blown object, such as a 7.5-foot long 2 x 4, penetrated walls built with vinyl or fiber-cement siding at a speed of 25 miles per hour (mph). By comparison, a similar wood stud would need to travel at a speed exceeding 80 mph in order to penetrate a similar wall clad with brick veneer. Brick veneer can offer dramatically more protection from wind-blown debris than vinyl or fiber-cement siding.

For more information on research verifying the attributes of brick, go to the Brick Industry Association website at [www.gobrick.com](http://www.gobrick.com).

Bond patterns can be further enlivened by using brick units of a different texture or color in the bond pattern; therefore, it may be possible to portray many appearances using the same structural bond. Additional patterns may be produced by the appearance of the mortar joint or by projecting or recessing certain bricks from the plane of the wall, thus creating a distinctive wall texture that is not solely dependent upon the texture of the individual brick.

The five traditional bond patterns commonly in use today consist of running bond, common or American bond, Flemish bond, English bond, and stack bond as illustrated in Figure 2. Through the use of these bonds, the variations of the color

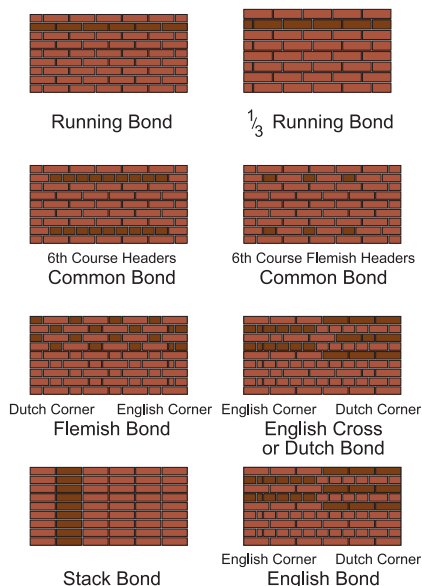


Figure 2. Traditional Bond Patterns

Third and quarter bond are typically used when the brick length is three or four times its width, respectively. Such a pattern reduces cutting at returns and ends of walls. Third and quarter bond patterns can be further modified by moving the overlap in steps, rather than returning the third course to the original overlap location.

**Common or American Bond.** Common or American bond is a variation of running bond with a course of full-length headers at regular intervals. These headers provide structural bonding in multi-wythe walls, as well as pattern. Header courses usually appear at every fifth, sixth, or seventh course.

In laying out any bond pattern, it is important that the corners be started correctly. For common bond, a three-quarter brick should start each way from the corner at the header course.

Common bond may be varied by using a Flemish header course.

**Flemish Bond.** Each course of brick consists of alternate stretchers and headers, with the headers in alternate courses centered over the stretchers in the intervening courses. Where the headers are not used for the structural bonding, they may be obtained by using half-brick, called “clipped” or “snap” headers. Some manufacturers simulate the combination of a stretcher and a header by making specially-shaped bricks with a recess to mimic the mortar joint between them.

Flemish bond may be varied by increasing the number of stretchers between headers in each course. If there are three stretchers alternating with a header, it is known as “garden wall” bond. If there are two stretchers between headers, it is designated as “double stretcher garden wall” bond. Garden wall bond may also be laid with four or even five stretchers between the headers.

**English Bond.** English bond is composed of alternate courses of headers and stretchers. The headers are centered on the stretchers, and joints between stretchers in all courses are aligned vertically. Snap headers are used in courses which are not structural bonding courses.

**English Cross or Dutch Bond.** English cross or Dutch bond is a variation of the English bond, differing only in that the vertical joints between the stretchers in alternate courses do not align vertically. These joints center on the stretchers themselves in the courses above and below.

There are two methods used in starting the corners in Flemish and English bonds. Figure 2 shows the so-called “Dutch corner,” in which a three-quarter brick closure is used, and the English corner, in which a 2 in. (51 mm) or quarter brick closure—also called a “queen closure”—is used. The 2 in.

and texture of brick, and the joint types and color, an almost unlimited number of patterns can be developed.

**Running Bond.** The simplest of the basic pattern bonds, the running bond consists of all stretchers. Since there are no headers in this bond, metal ties bond the wythe to the backing. Running bond is frequently used largely in cavity wall construction and veneered walls of brick.

Running bond can be laid in a half bond, a third, or a quarter bond pattern, with the half, third, and quarter referring to the length of the overlap with the courses below and above.

Third and quarter bond are

(51 mm) closure should always be placed 4 in. (102 mm) in from the corner and never at the corner itself.

**Stack Bond.** Stack bond is purely a pattern bond. There is no overlapping of units since all vertical joints are aligned. When a brick veneer is laid in stack bond, at least one wire of size W1.7 (MW11) is required to be spaced at a maximum of 18 in. (457 mm) on center vertically. In stack bond, it is important to use pre-matched or dimensionally accurate brick if the vertical alignment of the head joints is to be maintained. Generally, brick units conforming to ASTM C 216 Type FBX or C 652 Type HBX are specified when a stack bond brickwork is designed.

**Diamond Pattern.** Variations of brick colors and headers are used to create diamond patterns in brickwork. The small brick size and repetition of the courses provides a means for this design feature.

**Herringbone Pattern.** More commonly used as fireplace backs or in pavements, herringbone patterns can be used in exterior brick veneer. Since a herringbone pattern requires more time to be laid than a more traditional bond or pattern and is not able to be constructed around the corners of the brickwork, it is usually constructed as an accent feature, such as a flush or recessed panel within the brickwork. Such panels are usually positioned within the brickwork so that flashing, weeps, lintels, and shelf angles are not located within the herringbone panel since these are more easily installed on bonds and patterns with horizontal mortar joints. As with all bonds and patterns, wall anchors (ties) must be placed between the brick veneer and backing substrate.

**Mortar Joints**

While it may not be intuitive, mortar joints can play a significant role in the appearance of brickwork. For example, if mortar joints 3/8 in. (9.5 mm) wide are used to set modular brick units in a running bond pattern, 18% of the resulting brick wall surface will be comprised of the joints. With this much surface devoted to the mortar, it is important to consider the color of the mortar as well as how the mortar joint will be struck or tooled.

Mortar serves four functions in brick veneer:

1. It bonds the bricks together and seals the spaces between.
2. It compensates for dimensional variations in the brick.
3. It bonds to the anchors in the brickwork allowing lateral loads to be transferred to the backing.
4. It provides a decorative effect on the wall surface by providing color and creating shadow lines.

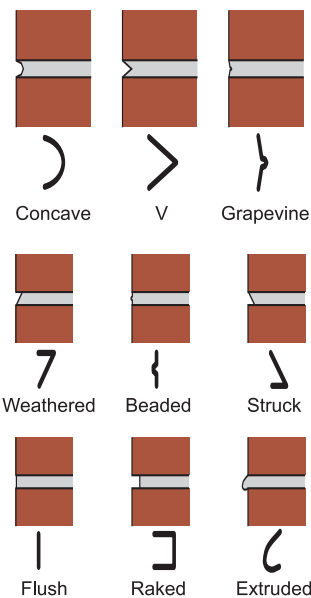


Figure 3. Mortar Joints

**Types of Mortar Joints.** Mortar joint finishes generally fall into two classes: troweled and tooled joints. For a troweled joint, excess mortar is simply cut off, or struck, and finished with a trowel. For the tooled joint, a special steel jointing tool is used to compress and shape the mortar in the joint. Figure 3 shows a cross section of mortar joints found in brickwork.

Concave, V-shaped, and grapevine mortar joints are recommended for their water penetration resistance. The pressure applied to the mortar during the tooling of these joints consolidates the mortar, thereby effectively resisting rain penetration. Even though the beaded and raked mortar joints are made with a steel jointing tool, limited compaction occurs. In addition, the small raised bead of mortar

in the beaded joint is exposed to the weather on three sides. Weathered, struck, and flush mortar joints are made with a trowel resulting in limited consolidation. The extruded mortar joint with no compaction and exposure to weather on three sides is the worst joint for water resistance.

**Timing of Mortar Joint Tooling.** The color and texture of a mortar joint can also be influenced by the amount of moisture present when tooled. Mortar joints should be tooled when they are “thumbprint” hard—that is, when pressing the thumb into the mortar leaves an indentation, but when no moisture is transferred to the thumb. This is the point when the steel jointing tool will produce a smooth surface in the mortar, which will then retain its shape. Joints that are tooled too early often smear and result in slick joints. The surface of joints that are too dry will crumble when tooled and, not allow the mortar to conform to the shape of the tool. Earlier tooling results in a lighter-colored mortar joint while later tooling results in a darker or “burned” joint.

The point at which the proper moisture content is reached in the mortar joint for tooling may vary depending on the environmental conditions present at the job site and the initial rate of absorption (IRA) of the brick units. Because both of these conditions vary, the period of time to wait before tooling can change from one day to the next.

**Colored Mortar.** Colored (tinted) mortars may be obtained through the use of colored aggregates or suitable pigments. Mortars may be tinted to enhance the patterns in brick or to create a more monolithic appearance. The use of colored aggregates is preferable when the desired mortar color can be obtained in this fashion. White sand, ground granite, or stone usually has permanent color and does not weaken the mortar. For white joints, use white sand or ground limestone with white portland cement and lime.

The pigments used for tinting mortar must be

- sufficiently fine to disperse throughout the mix;
- capable of imparting the desired color when used in permissible quantities; and
- must not react with other ingredients to the detriment of the mortar.

These requirements are generally met by metallic oxide pigments. Carbon black and ultramarine blue have also been used successfully as mortar pigments. Avoid using organic colors and, in particular, those colors containing Prussian blue, cadmium lithopone, and zinc and lead chromates. Paint pigments may not be suitable for mortars. Most pigments which conform to ASTM C 979, Standard Specification for Pigments for Integrally Colored Concrete, are suitable for mortar.

Use the minimum quantity of pigments that will produce the desired results, as an excess may seriously impair strength and durability. The maximum permissible quantity of most metallic oxide pigments is 10% of the cement content by weight. Although carbon black is a very effective coloring agent, it will greatly reduce mortar strength when used in greater proportions. Therefore, limit carbon black to 2% of the cement content by weight.



Crocker Park is an example of a lifestyle retail center in Westlake, Ohio, a suburb of Cleveland. At roughly 1.2 million square feet, Crocker Park offers a vertically integrated Main Street with a variety of brickwork. Individuals desiring to “live above the store” can do so while office space, retail stores, and restaurants thrive below. Now viewed as the downtown Westlake never had, Crocker Park holds special events each month including parties, food samplings, and a farmers market.

Crocker Park

Architect: Bialosky + Partners Architects

Photographer: Scott Pease

For best results, use cement and coloring agents premixed in large, controlled quantities. Premixing large quantities will assure a more uniform color than can be obtained by mixing smaller batches at the job. A consistent mixing sequence is essential for color consistency when mixing smaller batches at the job. Further, use the same source of mortar materials throughout the project.

Color uniformity varies with the amount of mixing water, the moisture content of the brick when laid, and if the mortar is retempered. The time and degree of tooling and cleaning techniques will also influence the final mortar color. Color permanence depends upon the quality of pigments as well as the weathering qualities of the mortar.

### Accents

Of the many ways to add interest to a brick project, one of the simplest and least expensive is to provide accents. While materials used to make accents can consist of other masonry materials, generally the least expensive accent material is contrasting brickwork. Accents can be created with almost any size, color, or texture of brick.

**Brick Bands.** Bands provide ornamentation or draw attention to or away from specific building elements. Accent bands as simple as a single soldier or stretcher course around a building’s perimeter are often used to reduce the scale of a large building or to emphasize horizontal elements. A band that appears decorative may also hide elements such as expansion joints, exposed flashing, and weeps at shelf angles by making them attractive elements in design.

When possible, accent bands should be brick. Different colors and textures, as well as bands which include different bond patterns and orientations, provide interest to the brickwork. Variations such as these may result in cost savings over bands of other materials. However, it is important that brick of different colors or from different manufacturers have compatible unit dimensions for the brick face placed in the wall. Units that do not have compatible dimensions must have the difference compensated for with a different thickness of mortar head joints.

When bands of brick are used throughout the brickwork, they are usually referred to as brick banding. This type of banding can add depth and character and can create an almost fabric-like texture to the wall. This type of treatment is especially effective when different size elements are desired in the wall. Not only is scale given by the individual brick and mortar joints when close to the wall, but the colored bands can offer a different scale at a greater distance.

**Panels.** Brick panels can be constructed flush, recessed, or even as projections. While it is least expensive to install rectangular or square panels which coincide with brick coursing and head mortar joints, circles or ellipses are also possible. Curved rowlock or soldier courses can add interest to the top of a rectangular panel.

Flush panels are best when there is a concern of minimizing the air space behind the veneer. Stack bond, especially of half-brick, creates long vertical mortar joints and helps flush panels stand out. Using different colored brick or a tinted mortar can create even more contrast.

Recessed and projected panels can add shadow and depth. A sloped rowlock sill similar to a window can be added at the bottom to increase depth and assist in drainage. If an interior space dictates a solid wall where a window would otherwise be placed for a fenestration pattern, a recessed brick panel the same size as the other masonry openings will maintain the exterior pattern. Such a detail is also useful to imitate a window opening that has been removed.

**Accents in Other Materials.** Sometimes, materials other than brick are used to create contrasting bands or panels in brick veneer. Generally, these other materials expand or contract at a rate different from the surrounding clay brickwork. Unless details and construction address this difference, cracking and increased water penetration may result.

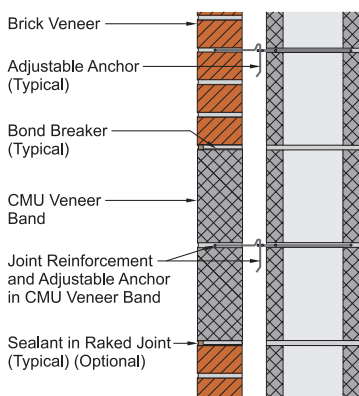
When an accent band of another material is specified, it should be detailed so that movement between the two materials is not restricted. This can be achieved by placing a non-staining bond break material (flashing, building felt, polyethylene, etc.) into the bed joints above and below the band to separate the band and the surrounding brick masonry (see Figure 4). Because the bond has been broken, it is important to ensure that the portions of the wall both above and below, as well as the band itself, are adequately anchored to the backing or adjacent wythe. Wall anchors (ties) should be spaced no more than 18 in. (457 mm) on center vertically. Bed joints above and below the accent band may be raked back  $\frac{3}{8}$  to  $\frac{1}{2}$  in. (9.5 to 12.7 mm) and filled with a backer rod or breaker tape and sealant.

Vertical cracking in head joints often results when bands of concrete masonry units are used to accent brick masonry. The frequency and size of cracks can be reduced by placing joint reinforcement into the bed joints of the concrete

masonry. Because of the bond break and the inability to provide joint reinforcement, concrete masonry bands that consist of a single course may be more susceptible to cracking. Closer spacing of expansion joints in brick masonry and control joints in the concrete masonry may help reduce cracking in this condition as well as bands of multiple courses.

**Recessing and Projecting.** Entire courses or individual bricks can be recessed or projected to provide horizontal breaks in the brickwork. Brick courses should not be recessed or projected to expose the core holes, cells, or frog of the brick. Generally this means limiting the movement of the course to  $\frac{1}{2}$  in. (12.7 mm) in or out of the wall. Using a chamfered brick in the course below a recessed course or at the top of a projected course can facilitate drainage of water from this surface. A horizontal mortar joint can be recessed within brickwork without moving the brick by using a chamfered brick unit in the courses above and below the joint.

**Corbels.** In load-bearing multi-wythe brick masonry, corbels were often used to finish and apply a decorative treatment to the top of a wall. This was usually accomplished without reinforcement due to the thicker brick masonry wall.



**Figure 4.** Concrete Masonry Band Detail



Boasting brick detailing reminiscent of days gone by, the Whole Foods Market in Washington, D.C. established itself as a dominant presence in a once-declining area. After the grocery store was complete, surrounding buildings also took up the challenge and raised the neighborhood to new design heights.

Whole Foods Market

Architect: Mushinsky Voelzke Associates / MV+A

Photographer: Dan Cunningham

For contemporary brickwork composed of a single-wythe of brick veneer, an unreinforced corbel cannot project as far since the total corbel must be less than one-half the veneer thickness.

Unreinforced corbels in brick veneer should meet the following requirements:

- The projection of each course should not be more than one-half the height of the brick unit or one-third the nominal thickness of the brick veneer.
- The total corbel should not exceed one-half the masonry veneer thickness.
- Corbelled brick with core holes and frogs should not expose the coring or frogs.

## Summary

Brickwork is an indelible material uniquely qualified to create a sense of place. In the words of Louis Kahn, *“The brick was always talking to me, saying you’re missing an opportunity...”*

His oft-quoted sentiment still rings true.

## BIA Technical Notes on Brick Construction

The Brick Industry Association’s *Technical Notes on Brick Construction* have long provided guidance on brickwork to the design and construction professions. For further recommendations on brick bonds, patterns, and mortar joints, refer to BIA *Technical Notes* 8B and 30.

# Crafting Space with Brickwork—Brick's Role in Retail Development

## AIA/CES Questionnaire

**Program Title:** *Crafting Space with Brickwork—Brick's Role in Retail Development*

**AIA/CES Credit:** This article will earn you one AIA/CES LU hour of health, safety, and welfare credit. (Valid through February 2009.)

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**Questions:**

1. What primary factor(s) was/were behind the flight of retailers from downtown Main Street areas?  
(a) Mass production of the automobile and highway development  
(b) A need for larger retail stand-alone stores  
(c) A need to develop large shopping malls  
(d) All of the above
2. Which of the following is a false statement?  
(a) 3 1/2 inch brick veneer using hollow brick can meet a one-hour fire resistance rating.  
(b) No wall assembly with brick veneer can meet Florida's impact resistance requirements for essential facilities constructed in a high velocity hurricane zone.  
(c) Communities with masonry ordinances attract more retail customers.  
(d) Brickwork can help break up the mass of building elements to minimize the overall size of a development or building.

3. In what position must brick be laid in a wall for a running bond pattern?  
(a) Rowlock stretcher  
(b) Header  
(c) Stretcher  
(d) Sailor
4. For the 2 in. brick closure unit used in the English bond, which of the following statements is false?  
(a) It is also known as a quarter brick closure.  
(b) It should be placed at the corner.  
(c) It is also known as a queen closure.  
(d) None of the above
5. Where is the herringbone pattern not usually used and why?  
(a) As a fireplace back since the brickwork is more susceptible to cracking when laid in this pattern  
(b) In pavement applications since it does not handle lateral loads imposed by traffic well  
(c) As field brick since it is not able to be constructed around the corners of brickwork  
(d) In recessed or flush panels within brickwork since there is too much cutting of brick involved
6. The purpose of mortar within brick veneer is to ...  
(a) bond brick together and attach anchors from the backing to the brick veneer.  
(b) compensate for dimensional variations of the brick units.  
(c) provide a decorative effect on the wall surface by providing color and creating shadow lines.  
(d) All of the above

7. Which of the following could have an influence on the color of tinted mortar?  
(a) Pre-mixing large quantities of colored mortar  
(b) Moisture content of the brick when laid  
(c) Retempering of mortar  
(d) All of the above
8. What is recommended by BIA to create a recessed horizontal mortar joint in brickwork without recessing the brick units in the courses above and below it?  
(a) Chamfered brick units in the course above and below the mortar joint  
(b) A raked mortar joint  
(c) A struck mortar joint  
(d) None of the above
9. Mortar joints tooled too early may result in ...  
(a) crumbling mortar.  
(b) a darker-colored mortar joint.  
(c) a lighter-colored mortar joint.  
(d) cracking of the mortar joint.
10. Which of the following corbelled brickwork requirements is incorrect?  
(a) Projection of entire corbel should not exceed one-third the masonry veneer thickness.  
(b) Projection of each course should be no more than one-third of the nominal thickness of the brick veneer.  
(c) Projection of each course should be no more than one-half the height of the brick unit.  
(d) Projection of entire corbel should not exceed one-half the masonry veneer thickness.

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