



BRICK ARCHITECTURE

From the Brick Industry Association



The 2012 Brick In Architecture Award Winners



BEST IN CLASS WINNERS

IN THIS ISSUE – DECEMBER 2012

Since 1989, the Brick in Architecture Awards have been one of the most prestigious national architectural award programs featuring clay brick. Architecture firms from around North America enter their best projects to be judged by a jury of their peers.

This year, architects from around the United States independently reviewed and scored each of the entries. Based on the technical and creative use of brick in meeting the aesthetic and functional design challenges, the Brick Industry Association is pleased to showcase the following projects which were chosen as the Best In Class in their respective categories.



Atlantic Wharf Boston, Massachusetts

Brick Plays a Pivotal Role in the New Boston Skyline

Certified LEED® Platinum, Atlantic Wharf is the first sustainable high rise in Boston. This watershed development is a series of restored and renovated historic brick structures that preserve the texture and streetscape of the site while integrating a modern high-rise glass tower to become a landmark in the Boston skyline.

The preservation of the historic existing façades of the 1899 Peabody & Stearns Building and the Graphic Arts/Tufts Buildings proved an essential component to the project. The structure behind these façades was demolished carefully while the 12-inch thick, 90-foot high walls were stabilized and new construction was added behind.

The tower's highly detailed maritime expression and its glass curtain wall contrast with the area's historic past. The brick base of the building was meticulously cleaned, preserved, and improved to

provide a contextual yet modern retail and office base. Taken as a whole, the new structure successfully reflects the emerging architectural styles of the surrounding neighborhood.



A dramatic glass and brick atrium stands at the center of the complex. This main entry spans the original 19th-century street pattern and is flanked by two brick "exterior" walls. The wall on the outside of the Graphic Arts/Tufts building was carefully recreated with new masonry and mortar to match the historic preserved façade on the south and west sides. The wall on the north side of the atrium, however, was too damaged and required the removal and replacement of one wythe.

The meticulous preservation of the brick façades at Atlantic Wharf created a unique office block that enabled the owner to successfully market to creative and high-tech firms looking for more rustic, loft-like space. The resulting complex is a shining example of the confluence of sustainability, modern architecture, historic building façade reuse, and successful mixed-use development. ■



Atlantic Wharf is a shining example of the confluence of sustainability, modern architecture, historic building façade reuse, and mixed-use development.



Architect:

CBT Architects

Builder:

John Moriarty & Associates, Inc.

Brick Mason:

A. Jandris & Sons, Inc.

Photographers:

Anton Grassl

Mark Flannery Photography

Bruce T. Martin Photography

Credits appear as submitted in entry form



The Ogden International School of Chicago Chicago, Illinois

A 100-Year Plan in Chicago Starts With Brick

The Chicago Public Schools have a universal building program that promotes durable, healthy, safe, and sustainable new school construction. According to the program, all new schools must be built with high quality, easily maintainable materials made to last 100 years. With this durability in mind, the selection of clay brick—with its minimal maintenance and proven performance in the harsh Chicago climate—was an obvious solution for the new Ogden International School of Chicago.

Aesthetically, however, the design of the Ogden School varies significantly from the CPS school prototype. Bordered by high-rise condominiums, retail facilities, an historic library, and a Scottish Rite Cathedral, the surrounding neighborhood features larger scale buildings rich with historical significance. The Ogden School, therefore, needed to be muscular enough to hold its place in this urban context while maintaining a warm and welcoming environment for the student body. The selection of masonry finish materials proved key to meeting this design challenge. In addition, the masonry detailing features a lively blend of texture, color, and rhythm that reflects the youthful occupants and relates to the art moderne architectural style common in the neighboring environment.



The clay brick veneer also serves as the first layer of protection for the building's envelope. As such, it manages both water and vapor migration with its contiguous cavity insulation and fluid-applied air barrier systems. The ultimate goal of the cavity wall design is to keep the water out of the building and promote a safe, acoustically sound, and healthy learning environment.

Finally, the architects employed clay brick veneer, not just on the exterior, but also in the Ogden School's interior. The dual use connects these interior and exterior spaces just as the school's brick and stone façade connects it to neighboring buildings.

Certified LEED Gold, the Ogden International School of Chicago has fulfilled the aspirational design goals of the Chicago Public School System. In addition, it has created an exceptional learning environment for its students through community-centered and sustainable design strategies. ■



As the first layer of protection for the building's envelope, clay brick manages both water and vapor migration with its contiguous cavity insulation and fluid-applied air barrier systems.



Architect:

Nagle Hartray Architecture

Builder:

Turner Construction Company

Associate Architect:

Schroeder Murchie Niemiec Gazda-Auskalnis

Brick Mason:

Illinois Masonry Corporation

Distributor:

Illinois Brick Company

Photographer:

Ballogg Photography

Credits appear as submitted in entry form





VIP Community Services, Men's Residences New York, New York

Brick Adds to a Bronx Community's Sense of Vibrancy and Permanence

Based in the Bronx, VIP Community Services has been so successful in providing supportive housing and services to people in substance abuse programs that they were in need of an additional men's facility.

The non-profit tasked the design team to create a warm and welcoming environment for people in great need of a sense of dignity, safety, and compassion. Architecturally, it was also important to relate the new facility to the scale and material diversity of the immediate neighborhood, which included many types and colors of low-rise, masonry construction. In addition, the volumes of the building needed to be expressive of the program functions within, so a variety of brick colors were used to define various massing elements such as the three stories of bedrooms, a vertical tower of common living rooms, and a one-story "base" wall. This wall in particular was clad in red brick as a clear nod to the immediately surrounding buildings. Articulating

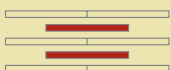
the volumes of the building in different brick helped to break down and humanize its scale while knitting it into the community.

Administrators also felt strongly that the new facility should empathize with the local community and therefore become a "good neighbor," a goal of utmost importance to their client. Clay brick not only blended in with the surrounding buildings, but it also gave the neighborhood a sense of permanence. Today the new men's facility has created a durable, vibrant new presence that will last for generations to come.

While the governing authorities did not allow the project to apply for LEED certification, the design team employed as many sustainable elements as possible within their budgetary constraints. In addition, the project utilized many green elements such as occupancy sensors, daylight harvesting, high-efficiency chillers, highly insulated walls and roof. ■



Clay brick not only blended in with the surrounding buildings, but it also gave the neighborhood a sense of permanence.



Architect:

WASA/Studio A

Brick Mason:

Procida Construction

Photographer:

Alexander Severin

Credits appear as submitted in entry form



Chapel and Administrative Wing DuPage African Methodist Episcopal Church Lisle, Illinois

A Growing Congregation Turns to Brick for its Harmonious Expansion

When the DuPage African Methodist Episcopal Church found its population of young families growing, the congregation decided to expand their space to include an area for small worship groups. This growth spurred the design and completion of the church's new chapel and administrative wing.

From an aesthetic perspective, clay brick was essential to accomplishing the design objectives of maintaining continuity with an existing building, composing solid planes to define space, and establishing a connection between building users and the natural surroundings. The color and scale of the new masonry matches the existing building, connecting the two. Organized by a series of transverse masonry planes, public spaces are defined in an open composition that engages the landscape. At the same time, however, the visual weight of the brick is in balance with the voids created by the glazing system, courtyards, and large program spaces. The masonry plane of the chapel shifts outward to engage the garden and allow daylight to spill in. Finally, the texture of the interior brick wall is animated by

changing shadows throughout the day and enables churchgoers engage with the material through both touch and sight.

Functionally, clay brick provides a durable and low-maintenance enclosure system. These beneficial attributes allow the DuPage A.M.E. congregation to concentrate their resources on ministry instead of facility operations. The brick itself is long-lasting and is resistant to damage by snow removal equipment. The brick veneer, coupled with superior insulation, also delivers lower operational costs over the long-term while the cavity wall works well to keep moisture out of the building interior. In addition, the mass of the brick walls provides the added benefit of dampening vehicular and other exterior noise, reducing distractions within the worship and program spaces.

Built with green principles in mind, the rain screen wall, high-performance glass, deep overhangs and additional insulation buffer the west façade from solar heat gain, which reduces energy consumption by 10%. From its durability and low maintenance to its natural green credentials, clay brick proved a harmonious material for this congregation's expansion. ■



The mass of the brick walls provides the added benefit of dampening vehicular and other exterior noise, reducing distractions within the worship and program spaces.



Architect:
Harding Partners
Builder:
Moreton Construction
Manufacturer:
Hanson Brick
Brick Mason:
J and E Duff
Distributor:
Illinois Brick Company
Photographers:
Christopher Barrett Photographer
Harding Partners

Credits appear as submitted in entry form





Wylie Civic Complex Wylie, Texas

Custom Made Brick Gives Architectural Distinction to a New Texas Civic Center

One look along the 800-foot skylighted spine of the Wylie Civic Complex reveals three distinct programs—a city hall, a recreation center, and a public library. Despite the complex functions of each, the project goals were clear.

City administrators tasked the architects to create an iconic civic structure to last more than one hundred years, express visually the fundamental principles of sustainability, and connect users to the natural landscape of the former ranch site. Very early in the design process, it became clear that the use of brick would accomplish all of these goals.

To provide architectural distinction, the design team commissioned a custom-made brick. They worked closely with the brick manufacturer to create an iconic new brick shape made specifically for the project but at the same cost as a standard shape. The unique “W” shape is laid in bands, casting dramatic shadows across the façade. Alternating sections of smooth and “W”-shaped bricks work in concert to add texture and pattern, breaking up the scale of the long expanse and accentuating the varying heights of the three distinct program volumes.

The regional manufacture and composition of natural elements helped contribute to the project’s LEED Silver certification. In addition, brick’s thermal mass also

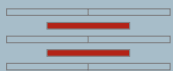
benefits the occupants by slowing heat gain or loss through the wall. Brick’s ability to withstand the strong Texas sun and its durable properties ensure low maintenance requirements for the buildings.

Finally, the brick’s traditional terracotta color complements the south meadow’s verdant landscape, creating an enclosure that circles the natural area. The brick’s color is also common throughout the area, so its familiarity made it an ideal choice to entice residents to linger in the courtyards.

Overall, the Wylie Civic Complex accommodates multiple functions and serves as a community hub for a variety of community users. ■



The design team worked with the brick manufacturer to create an iconic brick shape made specifically for the project but at the same cost as a standard shape.



Architect:

Holzman Moss Bottino Architecture, in association with Architexas

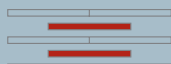
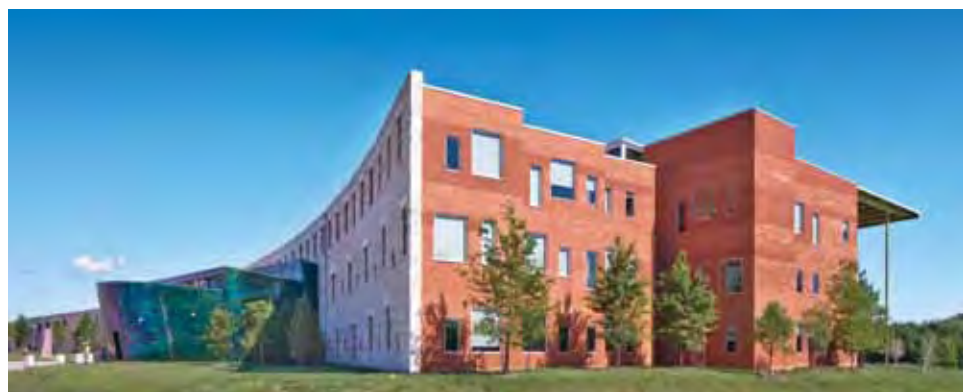
Brick Mason:

DMG Masonry Limited

Photographer:

Blackink Architectural Photography

Credits appear as submitted in entry form



Carmel City Center Carmel, Indiana

An Indiana City Adds Old World Charm with Clay Brick Pavers

With development spearheaded by the mayor, Carmel City Center offers a lifestyle-rich public space that includes luxury residences, retail shops, and dining options. It is an elegant cultural village sited on two acres of clay-paved city streets, a roundabout, and urban plazas punctuated with fountains.

The project borrows from Europe's charming piazzas and streetscapes with the intention of transforming residential Carmel into a vibrant downtown. The design team chose clay pavers for the fabric of the plazas, streets, and public ways because the pavers have a pedestrian-friendly human scale and possess timeless vibrant colors. When installed properly, their durability provides an excellent life span and requires very little maintenance.

The resulting paver design is so complex that the craftsmen laid a matrix of 42 unique paver sizes and patterns using seven different colors. Except at the fountain, the pavers were set on a bituminous setting bed. The construction under the flush fountain called for the pavers to be mortar set over a waterproof base. Seismic design considerations required the separation of buildings from walks and streets and the setting of the parking garage below the elevated plaza deck. Design of walkway and street expansion systems also required the integration of pavers and setting bed into the overall



design. Finally, engineered slopes were necessary to accommodate both pedestrian usage and integration of the fountain equipment into the plaza construction. At wet areas around the flush, central fountain of Hanover Square, pavers were mortar set over a rubber polymer waterproof membrane. Expansion joints were also created in the pavement design to accommodate paver movement and to create a watertight condition.

The choice of clay pavers both in the ground and in the surrounding hardscape was a natural one given the abundant clay brick found on the exterior walls of so many surrounding buildings. This sensible pairing creates aesthetic harmony and cohesion for the entire community to enjoy. ■



Carmel City Center required a matrix of 42 unique paver sizes and patterns using seven different colors.



Architect:

Pedcor Design Group, LLC

Builder:

Smock Fansler Corporation

Manufacturer:

The Belden Brick Company

Distributor:

Indiana Brick Corporation

Brick Mason:

Smock Fansler Corporation

Photographer:

Pedcor Design Group, LLC

Credits appear as submitted in entry form





The thermal mass of the brick helps modulate the flow of heat through the wall, resulting in energy savings.

Bud Clark Commons Portland, Oregon

Brick Lends Green Credentials to Portland's Newest Public Developments

As a centerpiece of Portland's Ten-Year Plan to End Homelessness, Bud Clark Commons represents a new approach to public housing. Their mission is to provide dignified housing and services to help those experiencing homelessness move toward a stable, safe, and healthy life. Located at the gateway to downtown Portland, Bud Clark Commons strikes a balance among rigorous programmatic requirements, a progressive design approach, and sustainable building practices.



Every detail at Bud Clark Commons was thoughtfully crafted to balance design, cost, performance, and durability. The design team chose a contrasting face brick in brown and cream to establish the different functions of the building and to draw a visual connection to its urban context. They punctuated windows with eight hues of green and yellow spandrel panels to help individualize residential units and to create a visually dramatic pattern.

on the planet. Benefits to users' health were considered in each design decision, and energy-saving technologies, materials, and construction methods were employed to ensure public resources were used wisely. Brick proved to be an excellent cladding material because of its thermal mass, which helps modulate the flow of heat through the wall, resulting in energy savings. It is also highly effective at resisting water infiltration and can resist heavy winds without damage. Most importantly, it is a material that requires little maintenance and is unmatched in durability.

The project's sustainable goals, however, took on an important role. Being "green" at Bud Clark Commons expressed itself by creating a place of dignity for their most vulnerable citizens while trading lightly

As a result, the building achieved a LEED Platinum certification with savings from energy-efficient technologies estimated at \$60,000 per year. ■

Architect:

Holst Architecture

Brick Mason:

J&S Masonry

Photographers:

Sally Schoolmaster

Christian Columbres Photography

Credits appear as submitted in entry form



The Point | NC State University Chancellor's Residence Raleigh, North Carolina

Clay Brick Gives the New NC State Chancellor's Residence a Home State Look and Feel

While physically home to the NC State University Chancellor, The Point has been designed as a home for the entire Wolf Pack Family. It serves as a venue for the entertainment of the many friends and dignitaries who come to campus, and it is the place where donors can be brought to experience the hospitality of the campus as shown by the chancellor. As such, the university challenged the architects to design a home that proved welcoming rather than intimidating, familiar rather than exotic, open rather than buffered, and of a personal scale rather than grand. It is an approach the design and building team came to identify as “familiar” or “soft modernism.”

Even from the very start, The Point is intended to be a true North Carolina experience. The materials

for the home—from the brick to the wood for framing, floors, ceilings and trim—all hail from North Carolina in an effort to represent the state's traditional building language in a contemporary fashion.



The decision to use materials such as brick, metal roofing, and wood flooring reflects the type of building that can be seen in local homes that predate the American Revolution. Similarly, the massing of the house is based on a simple gable form engaged with a chimney at each end and was adopted from home styles in surrounding communities. The specific color of the brick was chosen to match Holladay Hall, the first building constructed on the NC State campus, while the tumbled finish with a shallow raked joint gives the building a rich texture of shade and shadow.

To further the home's North Carolina pedigree, the designers built with locally-sourced brick and included a closed geothermal system of 14 wells for heating and cooling. Employing these very local and very green principles helped the Chancellor's residence attain the much-coveted LEED certification. ■



The brick color was chosen to match the first building constructed on the NC State campus, while the tumbled finish gives the building a rich texture.



Architect:
NC State University
Builder:
Ruffy Homes
Associate Architect:
Weinstein Friedlein Architects
Manufacturer:
Triangle Brick Company
Brick Mason:
Capitol City Masonry
Photographer:
dustin peck photography, inc.

Credits appear as submitted in entry form



The 2012 Brick in Architecture Award Winners

GOLD WINNERS

COMMERCIAL

Cranbrook Art Museum Collections Building
Location: Bloomfield Hills, Michigan
Architect: SmithGroupJJR
Landscape Architect: SmithGroupJJR
Builder: Frank Rewold & Sons
Manufacturer: Endicott Clay Products Company
Distributor: Brick Tech Architectural
Mason Contractor: Brend Masonry

Historic Park Inn Hotel

Location: Mason City, Iowa
Architect: Bergland + Cram
Builder: Henkel Construction
Manufacturer: Glen-Gery Corporation
Mason Contractor: Renaissance Restoration, Inc.

EDUCATIONAL

Federico Garcia Lorca Elementary School
Location: Chicago, Illinois
Architect: Schroeder Murchie Niemiec Gazda-Auskalnis Architects, Ltd.
Landscape Architect: Site Design Group
Builder: Leopardo Reyes Group Joint Venture
Distributor: Metropolitan Architectural Brick, Inc.
Mason Contractor: Illinois Masonry Corporation

The Joseph R. Drake School

Location: Bronx, New York
Architect: Nelligan White Architects PLLC
Manufacturer: Lee Brick & Tile Company, Inc.
Mason Contractor: Navillus Tile Inc.

Southern Polytechnic State University - Architectural Studio Addition

Location: Marietta, Georgia
Architect: Cooper Carry, Inc.
Manufacturer: Endicott Clay Products Company
Distributor: Alley-Cassetty Brick
Mason Contractor: O.L. Jolley, Inc.

HEALTH CARE FACILITIES

Northside Hospital Forsyth Radiation Therapy Center
Location: Cumming, Georgia
Architect: AE Design, Inc.
Manufacturer: Henry Brick Company, Inc.
Mason Contractor: Cornerstone Masonry, Inc.

HOUSES OF WORSHIP

St. Martha Catholic Church
Location: Porter, Texas
Architect: TurnerDuran Architects, LP
Builder: JE Dunn Construction
Manufacturer: Hebron Brick Supply Company
Mason Contractor: Winco Masonry

MUNICIPAL/GOVERNMENT/CIVIC

Kenedy County Courthouse Restoration
Location: Sarita, Texas
Architect: Lord, Aeck & Sargent Architects (formerly TWC Architects)
Landscape Architect: RVK Architects
Builder: JC Stoddard Construction
Manufacturer: Acme Brick
Distributor: Acme Brick
Mason Contractor: Mid-Continental Restoration Co., Inc.

The Lyric Theatre & Cultural Arts Center
Location: Lexington, Kentucky
Architect: Tate Hill Jacobs Architects
Landscape Architect: Carman
Builder: Denham-Blythe Company
Manufacturer: The Belden Brick Company
Distributor: Clay Ingels Company, LLC
Mason Contractor: Crossroads Masonry

PAVING & LANDSCAPE ARCHITECTURE

Villanova University – Transforming the Campus Landscape
Location: Villanova, Pennsylvania
Architect: Mark B. Thompson Associates, LLC
Landscape Architect: Wells Appel
Manufacturer: Endicott Clay Products Company
Distributor: Belden Tri-State Building Materials
Mason Contractor: Molly Construction

RESIDENTIAL – MULTI-FAMILY

38 Gramercy Park North
Location: New York, New York
Architect: Scott Henson Architect, LLC
Builder: Viles Contracting
Manufacturer: The McAvoy Brick Company
Mason Contractor: Viles Contracting

RESIDENTIAL – SINGLE FAMILY

Daulton House
Location: Decatur, Georgia
Designer: Clay Chapman
Builder: Period Architecture
Manufacturer: General Shale, Inc.
Mason Contractor: Period Architecture

SILVER WINNERS

COMMERCIAL

Age of Steam Roundhouse
Location: Sugar Creek, Ohio
Architect: F.A. Goodman Architects, LLC
Builder: W.M. Brode Company
Manufacturer: The Belden Brick Company
Mason Contractor: Lang Masonry Contractors

Navy Federal Credit Union, Heritage Oaks Campus, Building II

Location: Pensacola, Florida
Architect: ASD, Inc.
Manufacturer: Acme Brick
Mason Contractor: Bradley Masonry

EDUCATIONAL

Allard Hall, Faculty of Law – University of British Columbia
Location: Vancouver, BC, Canada
Architect: Diamond Schmitt Architects, CEI Architecture Planning Interiors, Architects in Joint Venture
Landscape Architect: Phillips Farevaag Smallemberg
Builder: ITC Construction Group
Mason Contractor: Dominion Masonry

Billy Graham Community Life Commons

Location: St. Paul, Minnesota
Architect: Perkins+Will
Landscape Architect: Perkins+Will
Builder: Adolfsen & Peterson Construction
Manufacturer: Bowerston Shale Company
Mason Contractor: Serice Construction, Inc.

Delaware State – Student Life Quad

Location: Dover, Delaware
Architect: Holzman Moss Bottino Architecture
Manufacturer: Glen-Gery Corporation
Mason Contractor: Enterprise Masonry Corp.

James M. Bennett High School

Location: Salisbury, Maryland
Architect: Becker Morgan Group, Inc.
Builder: The Whiting-Turner Contracting Company
Manufacturer: The Belden Brick Company
Mason Contractor: Manganaro MidAtlantic, LLC

Usdan University Center - Wesleyan University

Location: Middletown, Connecticut
Architect: Kallmann McKinnell & Wood Architects
Landscape Architect: Robert Olsen & Associates
Builder: FIP Construction, Inc.
Manufacturer: Glen-Gery Corporation
Distributor: Spaulding Brick Company, Inc.
Mason Contractor: F. Monarca Masonry Enterprises, Inc.

Westside High School Performing Arts Addition

Location: Omaha, Nebraska
Architect: DLR Group
Builder: Constructs, Inc.
Mason Contractor: Baggett Masonry

HEALTH CARE FACILITIES

St. Mary's Regional Medical Center Regis A. Lepage Surgical Pavilion
Location: Lewiston, Maine
Architect: SMRT Architects and Engineers
Builder: Hebert Construction
Manufacturers: Endicott Clay Products Company
Morin Brick Company
Distributor: Morin Brick Company
Mason Contractor: Charles H. Roberts, Inc.

HOUSES OF WORSHIP

Horizon Community Church
Location: Cincinnati, Ohio
Architect: CDH Partners, Inc.
Builder: Turner Construction
Manufacturer: Cherokee Brick & Tile Company
Mason Contractor: Ollier Masonry, Inc.

MUNICIPAL/GOVERNMENT/CIVIC

Marion Square Storage Facility
Location: Charleston, South Carolina
Architect: Cummings and McCrady, Inc. Architects
Manufacturer: Hanson Brick
Mason Contractor: Building Restoration and Preservation/American College of Building Arts

PAVING & LANDSCAPE ARCHITECTURE

Pool House Renovation on a French Manor Estate
Location: Greenwich, Connecticut
Architect: Hilton-VanderHorn Architects
Manufacturer: General Shale, Inc.
Mason Contractor: Kulinsky Construction, LLC

RESIDENTIAL – MULTI-FAMILY

The Kalahari
Location: New York, New York
Executive Architect: GF55 Partners
Landscape Architect: Elizabeth Kennedy Landscape Architects
Design Architect: Frederic SCHWARTZ Architects
Builder: First Avenue Builders, LLC
Manufacturer: The Belden Brick Company
Distributor: Belden Tri-State Building Materials
Mason Contractor: MC&O Masonry, Inc.

97 Croke Avenue Supportive Housing

Location: Brooklyn, New York
Architect: Dattner Architects
Landscape Architect: Lee Weintraub Landscape Architecture
Manufacturer: The Belden Brick Company
Mason Contractor: Larino Masonry, Inc.

RESIDENTIAL – SINGLE FAMILY

Cousins Residence
Location: Mooresville, North Carolina
Architect: Elite Design Group
Builder: Kingswood Custom Homes
Manufacturer: General Shale, Inc.
Mason Contractor: Efrain Cruz Masonry

Private Residence – Atlanta, Georgia

Location: Atlanta, Georgia
Architect: Stephen Fuller Designs
Landscape Architect: Land Plus Associates, Ltd.
Builder: Bill Grant Custom Homes, LLC
Manufacturer: Glen-Gery Corporation
Mason Contractor: Leija Construction Company

Tudor Residence

Location: Scarsdale, New York
Architect: Carol Kurth Architecture, PC
Landscape Architect: John P. Slaker
Builder: Fortune Home Builders
Manufacturer: Glen-Gery Corporation
Mason Contractor: Rogliano Construction and Contracting Corp.

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BRONZE WINNERS

COMMERCIAL

Deacon Tower

Location: Winston-Salem, North Carolina
Architect: Walter Robbs Callahan & Pierce Architects, PA
Builder: Frank L. Blum Construction Company
Manufacturer: Pine Hall Brick Company, Inc.
Mason Contractor: Gates Construction Company, Inc.

National Rural Utilities Cooperative Finance Corporation Headquarters

Location: Dulles, Virginia
Architect: KGD Architecture
Landscape Architect: AECOM
Builder: Whiting-Turner Contracting Company
Manufacturer: The McAvoy Brick Company
Mason Contractor: United Masonry Incorporated of Virginia

Navy Federal Credit Union Heritage Oaks Campus, Parking Deck and Central Energy Plant

Location: Pensacola, Florida
Architect: ASD, Inc.
Manufacturers: Acme Brick
Endicott Clay Products Company
Distributor: Metro Brick & Stone Co.
Mason Contractor: Bradley Masonry

EDUCATIONAL

Calmecca Academy of Fine Arts & Dual Language

Location: Chicago, Illinois
Architect: STR Partners, LLC
Landscape Architect: Jacobs/Ryan Associates
Associate Architect: Schroeder Murchie Niemiec Gazda-Auskalnis Architects, Ltd.
Builder: F.H. Paschen / S.N. Nielsen & Associates
Manufacturer: Glen-Gery Corporation
Distributor: Illinois Brick Company
Mason Contractor: A.L.L. Masonry Construction Company, Inc.

Decatur High School Athletic and Performing Arts Building

Location: Decatur, Georgia
Architect: Collins Cooper Carusi Architects, Inc.
Manufacturer: Cherokee Brick & Tile Company
Distributor: North Georgia Brick Company, Inc.
Mason Contractor: Cornerstone Masonry

El Dorado Multi-Purpose Center

Location: El Dorado, Arkansas
Architect: Polk Stanley Wilcox Architects
Landscape Architect: Ecological Design Group, Inc.
Builder: CDI Contractors
Manufacturer: Endicott Clay Products Company
Mason Contractor: DMG Masonry

L.T. Cunningham Elementary School

Location: Houston, Texas
Architect: PageSouthernlandPage
Landscape Architect: Wong & Associates
Builder: Drymalla Construction
Manufacturer: Acme Brick
Distributor: Upchurch Kimbrough Company
Mason Contractor: City Masonry

School of Visual Arts Dormitory

Location: New York, New York
Architect: Rawlings Architects pc
Builder: Pav-Lak Company
Manufacturer: The Belden Brick Company
Distributor: Belden Tri-State Building Materials
Mason Contractor: Larino Masonry

University of Michigan – North Quad Residential and Academic Complex

Location: Ann Arbor, Michigan
Architect: Robert A.M. Stern Architects, LLP
Associate Architect: Einhorn Yaffee Prescott
Builder: Walbridge
Manufacturer: The Belden Brick Company
Distributor: Belden Brick Sales Company
Mason Contractor: Davenport Masonry

Youngstown State University Williamson College of Business

Administration

Location: Youngstown, Ohio
Architect: Strollo Architects, Inc.
Landscape Architect: Behnke Associates
Associate Architect: Perkins+Will
Builder: Marous Brothers Construction
Manufacturer: The Belden Brick Company
Mason Contractor: Lencyk Masonry Co., Inc.

HEALTH CARE FACILITIES

Psychiatric Research Institute

Location: Little Rock, Arkansas
Architect: Polk Stanley Wilcox Architect
Landscape Architect: P. Allen Smith and Associates
Builder: CDI Contractors
Manufacturer: Acme Brick
Distributor: Acme Brick
Mason Contractor: C B Masonry, Inc.

Shore Medical Center Surgical Pavilion

Location: Somers Point, New Jersey
Architect: Ballinger
Landscape Architect: Morris & Ritchie Associates, Inc.
Builder: Massett Building Company
Manufacturers: The Belden Brick Company
Hebron Brick & Supply Company
Distributor: Diener Brick Company
Mason Contractor: Palermo Bros. Contracting

St. Ann's Nursing Home

Location: Jersey City, New Jersey
Architect: Susan Baumann Architect
Landscape Architect: Birdsall Services Group
Builder: Barr and Barr, Inc., Builders
Manufacturer: The Belden Brick Company
Distributor: Belden Tri-State Building Materials
Mason Contractor: Stateline Construction Company

HOUSES OF WORSHIP

Arborlawn United Methodist Church

Location: Fort Worth, Texas
Architect: Hahnfeld Hoffer Stanford
Manufacturer: Acme Brick
Mason Contractor: Fenimore Blythe

Kennesaw United Methodist Church

Location: Kennesaw, Georgia
Architect: CDH Partners, Inc.
Manufacturer: General Shale, Inc.
Distributor: Alley-Cassey Brick
Mason Contractor: Chalidez Masonry, Inc.

Trinity Presbyterian Church – Alterations and Additions

Location: Montgomery, Alabama
Architect: Cole & Cole Architects
Manufacturers: Hanson Brick
Jenkins Brick Company
Mason Contractor: Thomas Construction & Masonry

MUNICIPAL/GOVERNMENT/CIVIC

Bristol Fire Department Headquarters & Rescue Station

Location: Bristol, Rhode Island
Architect: Brewster Thornton Group Architects
Manufacturer: Redland Brick Inc.
Mason Contractor: M. DiSandro & Sons Masonry, Inc.

Fire House No. 1

Location: Bay St. Louis, Mississippi
Architect: unabridged Architecture PLLC
Mason Contractor: Com-Addison J.V.

Grapevine Convention and Visitors Bureau

Location: Grapevine, Texas
Architect: ARCHITEXAS
Manufacturer: Acme Brick
Distributor: Acme Brick
Mason Contractor: J & E Masonry

PAVING & LANDSCAPE ARCHITECTURE

Lorain East Pier

Location: Lorain, Ohio
Landscape Architect: Behnke Associates Landscape Architects and Planners
Builder: Bramhall Engineering & Surveying
Manufacturer: The Belden Brick Company
Mason Contractor: Marous Brothers Construction

St. Ignatius Mall Renovation

Location: Cleveland, Ohio
Landscape Architect: Behnke Associates Landscape Architects and Planners
Manufacturer: Pine Hall Brick Company, Inc.
Distributor: The Thomas Brick Company
Mason Contractor: Down to Earth Landscaping

RESIDENTIAL – MULTI-FAMILY

artPLUS Residential Buildings

Location: New York, New York
Architect: GF55 Partners
Builder: L+M Development Partners
Manufacturer: The Belden Brick Company
Distributor: Belden Tri-State Building Materials
Mason Contractor: Zaro Contracting Masonry

The Metropolitan at 40 Park

Location: Morristown, New Jersey
Architect: RTKL Associates, Inc.
Manufacturer: Glen-Gery Corporation
Mason Contractor: Rui Pires Masonry Corp

Zoso Lofts

Location: Arlington, Virginia
Architect: WHA Architecture and Planning, PC (Exterior and Schematic)
Landscape Architect: Studio 39
Builder: The Signet Construction Companies
Associate Architect: Kishimoto.Gordon.Dalaya PC Architecture
Manufacturers: Carolina Ceramics Brick Company
Hanson Brick

Distributor: Potomac Valley Brick and Supply Company
Mason Contractor: United Masonry, Inc.

2 Cooper

Location: New York, New York
Architect: Gerner Kronick + Valcarcel Architects
Landscape Architect: Sullivan Group Design, LLC
Builder: Atlantic Development Group, LLC
Distributor: Belden Tri-State Building Materials
Mason Contractor: GMJ Construction

RESIDENTIAL – SINGLE FAMILY

Renovation to a French Manor Estate

Location: Greenwich, Connecticut
Architect: Hilton-VanderHorn Architects
Manufacturer: General Shale, Inc.
Mason Contractor: Kulinsky Construction, LLC

Toscana

Location: Cypress, Texas
Architect: DWP Architects, LLP
Builder: Morning Star Builders
Distributor: Western Brick Company, Inc.
Mason Contractor: Joe's Masonry Construction

All credit information appears as it was provided in the entry by the architect or BIA member company.

BIA would like to thank this year's judges for their efforts and expertise.

Steven Ansel - The S/L/A/M Collaborative
Jack LaQuatra, CLARB, ASLA - LaQuatra Bonci Associates
Nicholas Papaefthimiou - ZGF Architects, LLP
Sean Stadler, AIA, LEED AP - WDG Architecture

Use the following learning objectives to focus your study while reading the article below. To receive credit, turn to the back page and follow the instructions.

Learning Objectives

After reading this article you should be able to:

1. Understand the different colors and textures available in brick.
2. Properly detail the use of other materials in brickwork.
3. Understand different mortar joint types.
4. Specify colored mortars correctly.

One of the unique characteristics of brickwork is the wide array of visual effects that can be achieved, often at little increase in cost. In the hands of an experienced architect and skilled mason, a brick wall can become an artist's canvas. Viewed from a distance, the brickwork may be perceived as one uniform whole in color and texture. But as one draws nearer, the mortar joints and shadow lines become more distinguishable, giving the brickwork more expression. Stepping in closer may reveal differences in color from one brick unit to the next. Closer still and subtle differences in color within one brick unit may be noticeable.

INDIVIDUAL BRICK

The different colors and textures of brick are achieved by manufacturers in several ways. Most finishes are applied prior to the brick entering the kiln, but some finishes are applied after the brick have exited the kiln. Varying the color and texture of brick in a wall can create contrast in brickwork as shown in Figures 1 and 2.



Figure 1. Fields of contrasting brickwork - Cranberry Art Museum Collections Building ©James Haefner Photography

Color

Brick can be made in a wide array of colors. Brick's color depends upon the chemical composition of the raw material, the temperature at which it is fired, and the method of firing. Of all the oxides commonly found in clays, iron probably has the greatest effect on color. Regardless of its natural color, clay containing iron in practically any form will exhibit a shade of red when exposed to fire in the presence of oxygen due to the formation of ferrous oxide. When fired in a kiln in a reduced oxygen atmosphere, the same clay will assume a dark (or black) hue. Creating a reducing atmosphere in the kiln is known as "flashing" or "reduction firing" and can create variations in color not possible otherwise.

Through-Body Brick. So-called "through-body" brick are the same color throughout the entire brick. These brick receive their color from the clay or shale raw materials used to manufacture them and the kiln-firing process. Mixing together different proportions of different clays or shales result in brick of different colors. Additives may be used to attain certain colors. Given the same raw material and manufacturing method, darker colors are associated with higher firing temperatures, lower absorption values, and

higher compressive strength values. However, since most brick are made from different raw materials, there is no direct relationship between strength and color or absorption and color.

Fired Coatings. Many manufacturing plants apply engobes (slurries) of finely ground clay or colorants to the clay after it has been extruded. Engobes are fired onto the ceramic body and develop hardness, but are not impervious to moisture or water vapor. These coatings typically have a matte and non-reflective finish with earth or pastel colors. Sand, with or without coloring agents, can be rolled into an engobe or applied directly to the brick faces to create interesting and distinctive patterns in the finished product.

Glazes. Although not produced by all manufacturers, glazed brick are made through a carefully controlled ceramic glazing procedure. There are two basic variations of glazed brick: single-fired and double-fired. Single-fired glazes are sprayed on brick before or after drying and then fired in the kiln at the normal temperatures associated with firing brick. Double-fired glazes are used to obtain colors that cannot be produced at these high temperatures. Such a glaze is applied after the brick body has been fired and cooled, then refired at temperatures less than 1800°F (982°C). Glazes are available in a wide variety of colors and reflectance values. Unlike engobes, glazes are impervious to moisture, water vapor, and water and may be highly reflective with matte finishes.

Post-Fired Coatings. Some manufacturers apply coatings or surface treatments to brick after they have been fired. These coatings are often slurries which are splattered onto the face or faces that will be exposed once a brick is placed in a wall.

Texture

Brick are available in many textures – from smooth to very rough finishes. Each of the processes discussed below used to form clay imparts a unique finish to brick. Once formed, the surfaces of the brick may be further modified to achieve a number of looks.

Extrusion. In the stiff-mud or extrusion process, the clay is pushed through a steel die to produce a continuous rectangular "column" of clay with crisp, angular edges.

Extruded brick usually have core holes which are formed during the extrusion process. Individual brick are then cut from the clay column.

Die Skin (Smooth). If no further modifications are made to the extruded brick, then a smooth finish is produced. This finish is established by the steel die and has the look and feel of leather before the brick is fired.

Wire-Cut (Velour). If a wire is used to remove the die-skin surface created by the extruder, a wire-cut or velour finish results. This finish exposes some of the coarse particles near the surface of the brick and creates minute scratches in the finish as the small particles are dragged through the clay as the wire passes.

Tumbled. Brick may be tumbled before or after firing to introduce cuts, nicks and slight deformities resulting in an antique appearance.

Other Finishes. Texture may be added to a brick by using devices that cut, scratch, roll, brush, or otherwise roughen the surface of the clay.



Figure 2. Using brick with different color and texture within brickwork – The Kalahari ©Frederic SCHWARTZ Architects

Molded. In the soft-mud or molding process, the clay is deposited in wooden molds and struck across the top to remove excess clay. Prior to insertion of the clay, a releasing agent is spread on the surfaces of the mold box to prevent the clay from sticking. Molded brick may be produced in this manner by machine or by hand.

Sand Struck. This process relies on sand to coat the mold box as the release agent. Some of the sand remains on the brick and contributes to its texture and color.

Water Struck. Water coats the mold box which imparts a slight sheen to the brick after firing.

Handmold (Handmade). Each brick is individually formed and placed in a wooden mold by a brick craftsman to create a brick with many folds and layers of clay. This is the traditional method of making brick dating back many centuries and usually uses sand as a release agent.

Dry-Press. In this process, clay is pressed into steel molds under great pressure from hydraulic or compressed air rams. Dry-pressed brick are characterized by a smooth finish with minute crevices.

Specially-Shaped Brick. Brick can be made in other than rectangular prisms. Curved and sloping surfaces that project or recess can be incorporated. Accent bands and water tables are often comprised of specially-shaped brick.

BRICKWORK

As brick are placed in the wall by the mason, the brickwork takes form. Brick which cover the majority area of a wall are often referred to as “field brick.” Other brick used for features such as brick bands, soldier courses, quoins, or similar items are commonly known as “accent brick.” However, in the case where a brick feature, such as a brick band or panels, is predominant and is systematically repeated, it can be considered part of the field of brick. There are many approaches to achieving the desired color or visual effect in field brick.

Field Brickwork and Blends

Since field brick are the dominant color feature on the building, their appearance is critical. Selection of the brick, with its color range and texture, affects the appearance.

Color Range in a Blend of Brick. Generally for a particular blend of brick, there is a “range” of colors and hues. This color range gives a general idea of the degree to which one brick unit’s color can vary from another and the prevalence of each hue in that particular brick blend. For some brick, the color range is almost non-existent, meaning that the perceived difference in color between any two brick units is virtually negligible.

Brick with a “tight” color range will have a limited degree of color difference among the units. Since brick is a product made from natural ingredients, having an absolutely tight color range is nearly impossible. A blend of brick with a “loose” or wide color range will contain brick of many colors. Most manufacturers provide multiple brick units in a sample of brick to better represent the color in the blend of brick. A small sample of brick should not be expected to consistently match the extensive brickwork of an entire building.

Blending or “Mingling” Brick. Another method to achieve a wider array of colors within field brick is to mix or “mingle” two or more brick or blends of brick (see Figure 3). Blending or “mingling” brick offers an architect the means to combine several colors or blends of different brick within the same wall to create a unique look for a building. When selecting blends of brick for blending or mingling together for a project, it is often helpful to dry stack several walls using the same blends or colors of brick but vary the percentage of each included. For example, constructing a wall by blending 40% of brick color #1 and 60% of brick color #2 together could be compared to an adjacent wall that is built by blending 30% of brick color #1 and 70% of brick color #2. This technique has been used successfully



Figure 3. Blended or Mingled Brick - 97 Croke Avenue ©Vanni Archive

for mingling up to seven different colors or blends of brick in a wall at one time.

When blending brick, it is important to consider the potential size differences between the colors or blends of brick. With everything else equal during manufacture, darker-colored brick will be slightly smaller than lighter-colored brick. Constructing one or more mockup panels is recommended to ensure that the blended brick and the workmanship are acceptable.

Some manufacturers offer pre-blending or pre-mingling of brick in which each strap of a brick cube contains the proper portion of each color or blend of brick. A surcharge is usually applied for this service. When constructing brickwork from a pre-mingled brick cube, the mason should be careful to follow the sequence for unpacking and laying recommended by the manufacturer to ensure the proper distribution of each color throughout the wall.

Blending or mingling of brick also can be done on the job site by the mason contractor as the brick are laid. Adequate oversight by the architect and attention by the mason are required for quality assurance purposes. This approach is obviously more costly than accepting a blend as manufactured.

Accent Brickwork

One of the many ways to add interest to a brick project, and one of the simplest and least expensive, is to provide accent brick of contrasting colors and textures. Almost any size, color, or texture of brick can be applied. Accent brickwork may consist of adding a few brick per wall panel or may involve a more complicated pattern. Using accent brickwork may be a less expensive way to enhance a design compared to other measures.

Brick Bands. Bands can be used to provide ornamentation or draw attention to or away from specific building elements. Accent bands as simple as a single soldier or header 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 serve to hide elements such as expansion joints, exposed flashing, and weeps at shelf angles by making them bold or attractive elements in design.



Figure 4. Brick Bands – James M. Bennett High School ©Charles Uniatowski Photography/Becker Morgan Group



Figure 5. Bands of Other Materials – Deacon Tower
©Jim Sink Photography/Walter Robbs Callahan & Pierce Architects, PA

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

When bands of brick are used throughout the brickwork, they are usually referred to as “brick banding.” This can be used to add depth and character and give an almost fabric-like texture to the wall. This type of treatment is especially effective when different-sized 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 different-colored bands can offer a different scale at a greater distance as shown in Figure 4.

Bands of Other Materials. Materials other than brick are sometimes used to create contrasting bands in a brick façade as shown in Figure 5. 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 from the surrounding brick masonry as shown in

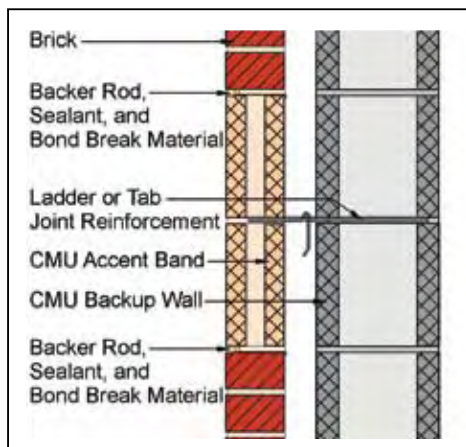


Figure 6. CMU Band Detail

Figure 6. 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. 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 3/8 to 1/2 in. (10 to 13 mm) and filled with a backer rod or breaker tape and sealant.

Vertical cracking in the head joints of concrete masonry 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 in bands of multiple courses.

MORTAR JOINTS

While it may not be intuitive, mortar joints can play a significant role in the appearance of a brick wall. Mortar provides a textural effect on the wall surface by creating shadow lines and contributes to overall color by contrasting or matching the brick color. For example, if mortar joints 3/8 in. (10 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 how the mortar joint will be struck, or tooled, as well as the color of the mortar.

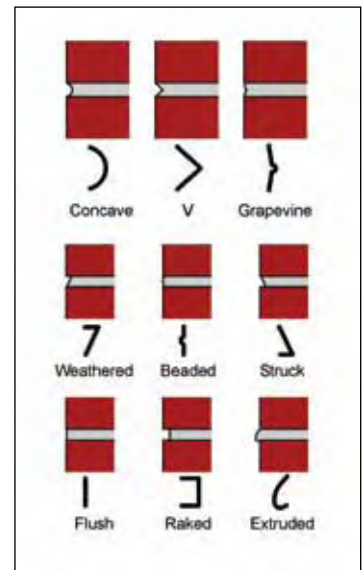


Figure 7. Mortar Joints

Types of Mortar Joints

Mortar joint finishes generally fall into two classes: troweled and tooled joints. For troweled joints, the excess mortar is simply cut off, or struck, and finished with a trowel. For the tooled joint, a special steel jointing tool generally referred to as a “jointer” is used to compress and shape the mortar in the joint. This is accomplished by pressing the jointer against the joint, forcing the mortar against the edges of the brick that surround the joint. The jointer also consolidates the mortar near the surface of the joint to create a denser material less susceptible to penetration by water once the mortar has cured.

Figure 7 shows profiles of mortar joints found in brickwork. The concave, V-shaped, and grapevine joints are made with a jointer tool and are recommended for their water penetration resistance.

Concave Joint. Like its name suggests, the concave joint creates a rounded depression in the mortar. This joint is formed by moving a jointer tool along the mortar joint while making contact with the edge of the brick course above and below. This movement consolidates the mortar, thereby increasing the resistance to rain penetration.

V-Shaped Joint. This joint is created with a V-shaped steel jointing tool in the same manner as the concave joint above. Like the concave joint, it compacts the mortar and is effective in resisting rain penetration. Shadows are more pronounced with this joint.

Grapevine Joint. This joint is similar to the concave joint but incorporates a small indentation in the middle. It is also made with a jointer tool that consolidates the mortar to effectively resist rain penetration when the jointer is pressed against the edges of the brick course above and below the mortar joint. The indentation is not a straight line,

since the jointer tool moves up and down slightly as it slides along the joint. This adds a variation to the uniform joint appearance of the other joint profiles.

Weathered Joint. This joint requires care as it must be formed with a trowel from below. However, it is the best of the troweled joints as there is some compaction and it is sloped to shed water. As with the V-shaped joint, the shadows of a weathered joint are more pronounced.

Beaded Joint. The profile of this joint shows a raised bead of mortar in the center. While formed with a steel jointing tool, the small beaded portion of this joint is exposed to the weather on three sides. Some compaction of the mortar occurs, but not to the extent of the concave, V-shaped, or grapevine joints.

Struck Joint. This type of joint was more prevalent when exterior brickwork was constructed from the inside of the wall since it is an easy joint to strike with a trowel from that position. While some compaction occurs, the small ledge does not shed water readily, resulting in a less watertight joint.

Flush or Rough-Cut Joint. The bricklayer makes this joint by holding the edge of the trowel flat against the brick and cutting in any direction. This produces an uncompacted joint with a small hairline crack where the mortar is pulled away from the brick by the cutting action. This joint is not always watertight.

Raked Joint. This joint is made by removing the surface of the mortar while it is still soft. Typically the depth is $\frac{1}{4}$ inch. Raking may expose openings in the remaining mortar and the surface of the joint should be tooled with a flat jointer to cover these instances. While the joint may have some compaction, it is difficult to make weather-tight. This joint produces marked shadows and tends to darken the overall appearance of the wall.

Extruded Joint. This appears to be the simplest joint for the bricklayer since there is no cutting or tooling involved. However, it is often difficult to construct since the normal bricklaying motion is to remove the mortar from the face of the wall. The excess mortar which is squeezed out of the joint as the brick is laid is left hanging on the wall. This produces a rough texture over the wall and more pronounced shadows. With the mortar exposed on three sides to the weather and no compacting, it 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 the mortar retains the imprint of a thumb pressed into it, but no mortar is transferred to the thumb. This is the point when the steel jointer tool will produce a smooth surface in the mortar, which will then retain its shape. Joints that are tooled too early often smear and do not consolidate the mortar. The surface of joints that are too dry will crumble when tooled and will 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 at the time they are laid. Because both of these will vary, the period of time to wait before tooling can vary even from one day to the next.

COLORED MORTAR

Colored mortars may be obtained through the use of colored aggregates or suitable pigments. The use of colored aggregates is preferable when the desired mortar color can be obtained in this fashion. Sand, ground granite, or stone usually have permanent color and will not weaken the mortar. For white joints, use white sand or ground limestone with white portland cement and lime.

Mortars may be successfully tinted to enhance the patterns in brick. Pigments used for tinting mortar must be sufficiently fine to disperse throughout the mix, must be 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 pigments 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 C979, Standard Specification for Pigments for Integrally Colored Concrete, are suitable for use in mortar.

Use the minimum quantity of pigments that will produce the desired results since adding too much may seriously impair the strength and durability of the mortar. The maximum permissible quantity of most metallic oxide pigments is 10% of the cement content by weight. Carbon black, which is not a metallic oxide, should be limited to 2% of the cement content by weight. Although it is a very effective coloring agent, carbon black will greatly reduce mortar strength when used in greater proportions.

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 depending upon the amount of mixing water in the mortar, the moisture content of the brick when laid, and whether the mortar is retempered. The time allowed for the mortar to cure and the extent of tooling and cleaning techniques will also influence final mortar color. Color permanence depends upon quality of pigments as well as weathering qualities of the mortar.

Summary

With all of the possibilities available for brickwork, from different sizes and textures to a wide color range, it is no wonder that brick masonry is used on so many projects. Creating these masterpieces while working with the mason contractor can result in truly spectacular projects.

BIA Technical Notes on Brick Construction

The Brick Industry Association’s (BIA) *Technical Notes on Brick Construction* have long provided guidance on brickwork to the design and construction professions. The information provided in the preceding technical discussion and in all issues of *Technical Notes on Brick Construction* is based on the available data and the combined experience of BIA engineering staff and members. The information must be used in conjunction with good technical judgment and a basic understanding of the properties of brick masonry. For further recommendations on brick masonry construction, refer to *Technical Notes 9 Manufacturing Brick* and *10 Dimensioning and Estimating Brick Masonry* at www.gobrick.com.



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For questions, contact Tricia Mauer at
tmauer@bia.org or 703.674.1539.



Let the Brick Industry Association know about your firm's projects that reflect excellence in design using clay brick. Your project will be considered for publication in upcoming issues of *Brick In Architecture*.

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