
BRICK ARCHITECTURE

From the Brick Industry Association



The 2010 Brick in Architecture Award Winners



BEST IN CLASS WINNERS

IN THIS ISSUE – NOVEMBER 2010

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.



Old Parkland Hospital Renovation Dallas, Texas

Brick Renovation Transforms Abandoned Hospital Buildings into an Energy-Efficient, Landmark-Inspired Campus

Dating all the way back to 1915, Old Parkland Hospital has led quite a history. After a brief stint as a minimum security prison, the campus was abandoned in 1974 until a local financial holding company purchased the property and began renovating it for their corporate headquarters. The project includes additions to and rehabilitation of a historic Federal-style hospital building and nurses' dormitory hall along with construction of two new office buildings, a 3,000-foot brick perimeter fence, and an underground parking structure. Brick was used throughout, both unifying the campus and differentiating the individual structures.

circulation and connection to underground parking. A larger addition to the hospital building provided new office space between the original wings. Here, a contemporary architectural expression was used to accentuate the juxtaposition of new and old. The new buildings all share the proportions and details of the historic structures, but the expressive qualities of brick allowed each to retain its own unique character.



The overall aesthetic goal was to create an inviting campus setting by combining new construction with an existing collection of abandoned buildings. As designated local historical landmarks, the existing façades were restored to their original appearance while the interiors were completely reconfigured for new uses. A modest addition to the rear of the original Nurses' Hall, consistent with the existing architecture, provided for new vertical

Several sustainable strategies were followed in the construction of this project. By rehabilitating existing buildings, the project retained much of the embodied energy originally expended in the buildings' construction. In addition, all of the visible repairs in historic exterior walls were made with salvaged brick. Their brick exteriors contribute to LEED credits for both Regional Materials and Recycled Materials, and contribute as well to the efficiency of the respective building envelopes. Finally, the Nurses' Hall is pursuing a LEED Gold certification while the two new buildings, Woodlawn Hall and Reagan Place, are each pursuing LEED Silver certification. ■



The expressive qualities of brick allowed the new buildings to share proportions and details with their historic counterparts while still retaining their own unique character.



Architect:

Good Fulton & Farrell

Principal:

Jonathan P. Rollins, AIA

Builder:

Andres Construction

Distributor:

Blackson Brick Company

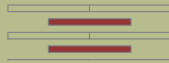
Mason Contractors:

ROC Construction

Metro Masonry Construction

Photographer:

Good Fulton & Farrell Architects



Meier Hall Dormitory Elmira, New York

Modern Brick Brings Traditional Gothic Campus into the 21st Century

When Elmira College hired the architects at QPK Design to create a new student dormitory, they gave them this challenge: design a competitive, contemporary dormitory that blends into the historic campus setting.

Elmira College's historically significant setting teems with collegiate Gothic architecture, making clay brick an integral part of the traditional fabric and character. Soaring towers, steeply pitched gables, crenellated terminations, and ornamental entries all complement the aesthetic abilities of brick.



To match the hand-molded brick found in the original buildings, the architects chose a modern alternative that provided the economy of an extruded brick while still offering a rolled edge and sand finish similar to the historic



brick on campus. Its cross-set and face-set firing provided for the variable face flash and increased visual texture.

The decision to introduce clay brick as the primary exterior building material was not only for the aesthetic considerations, but also for its durability and long life. At the outset of the project, the architects were tasked to design a building that would last more than 150 years; few exterior materials have the time-proven track record of brick.

The timeless quality of brick together with its robust aesthetic advantages and a traditional association with higher education ensure the building will provide a home for students well into the next century. ■



Soaring towers, steeply pitched gables, crenellated terminations, and ornamental entries all complement the aesthetic abilities of brick.



Architect:

QPK Design

Principal:

Eugenia C. Brieve, AIA

Builder:

Welliver McGuire, Inc.

Mason Contractor:

Welliver McGuire, Inc.

Manufacturer:

Glen-Gery Corporation

Photographers:

Don Cochran Photography

Christopher Pitulej





Howard Hughes Medical Institute Chevy Chase, Maryland

Brick Helps Land LEED® Gold Certification to Expanded Medical Institute's Campus

Twenty years after establishing its headquarters on a 22-acre wooded campus, the Howard Hughes Medical Institute launched a campaign to bring new generational workplace improvements to its campus. The result: a 150,000-square-foot office addition to its headquarters. Creating a harmonious connection between existing and new construction, the addition reinterprets and expands upon the special character of the existing complex. Designed as a “workplace in a garden,” the existing brick structure created a campus-like setting complete with courtyard views. The design team sought to continue this theme by expanding upon the existing language of masonry materials and detailing.

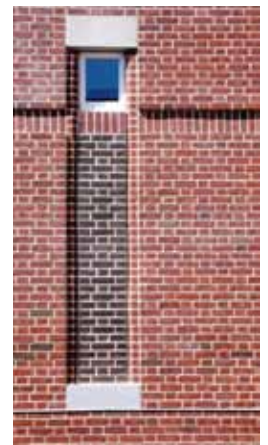
Because the project's primary aesthetic goal was clear—to create an addition in harmony with the existing environment—the design team chose brick masonry to serve as the thread that would connect all the elements. They developed

a rich vocabulary of masonry details and bonding patterns to create architecture respectful of the past, yet clearly representing a step forward in the organization's evolution.

In addition to providing the perfect aesthetic solution for the expansion, brick was also the logical choice for an institutional project where low maintenance, durability, and longevity were required.

The project was also conceived to enhance and further the company's commitment to green building practices. From the beginning, the project set out to achieve LEED Gold certification. Its energy-efficient brick envelope played a big role, particularly the brick rain screen configuration and sunshades incorporated into the brick at each window. In the race for LEED certification, the design team gained green points by locally sourcing the brick and assembling a building from regionally harvested and manufactured materials. ■

Brick provided the perfect aesthetic solution and was also the logical choice for a project where low maintenance, durability, and longevity were required.



Architect:
Bowie Gridley Architects

Principal:
Calvert Bowie, AIA

Builder:
Clark Construction Group, LLC

Mason Contractor:
Manganaro Midatlantic, LLC

Manufacturer:
Redland Brick, Inc.

Distributor:
Potomac Valley Brick & Supply Company

Photographers:
Bowie Gridley Architects
Prakash Patel Photography



Westchester Reform Temple Scarsdale, New York

Brick Helps Suburban Temple Gain LEED® Certification and Renewed Spiritual Energy

Westchester Reform Temple had an ambitious master plan for its suburban location: a re-designed campus that included a new sanctuary, a new Religious School and Study Center, and the renovation of existing structures. The temple's new sanctuary had many design goals, including the use of economic building materials, the incorporation of natural light (to create a worship space at once grand and intimate), and the creation of a visual connection to an exterior garden on the building's east side. By paying careful attention to the landscape and by developing pedestrian connections, the new design would enhance the spirit of place and unify the diverse buildings on campus.

The team at Rogers Marvel Architects aimed for its designs to have long-term use, efficiency, and aesthetic appeal. With these guidelines in mind, clay brick was the clear choice. Its inherent beauty, timeless relationship to the building and its occupants, and ability bolster the architectural elements. All helped fulfill the design goals and allowed the historical context of the campus to be maintained.

Aside from its aesthetic attributes, the design team also selected brick for its

functional benefits. Its strength and durability afford a low-maintenance exterior while also improving the safety and the security of the structure.

Completed in the fall of 2009, the temple embodies many sustainable philosophies and achieved LEED certification with the assistance of sustainability consultant, Buro Happold. The project contains 20% recycled materials and 20% regionally acquired materials; clay brick made an important contribution to these numbers. Perhaps one of the most unique sustainable elements is the centerpiece of the sanctuary: a solar-powered Eternal Flame. Powered by roof-mounted solar cells, this symbolic representation of the temple's core values reminds the congregation of its dedication to religion and sustainability. ■



Brick was selected as a material to provide a strong durable exterior shell while maintaining the historical context of the campus.



Architect:

Rogers Marvel Architects, PLLC

Principal:

Robert M. Rogers, FAIA

Mason Contractor:

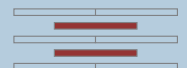
Hull Construction & Restoration, Inc.

Manufacturer:

Endicott Clay Products Company

Photographer:

Paul Warchol Photography



Prince William Adult Detention Center Manassas, Virginia

Brick Gives Expanded Detention Facility a Community-Pleasing Facelift

Community identity, adjacency to the existing court and detention complex, and a progressive detention management approach—these were the driving influences that informed the design of the Prince William Adult Detention Center. The historic neighborhood that hosts this facility was concerned with the potentially intrusive and disquieting nature of an expansion of the center, so the design began with a comprehensive master plan that recognized the city's historic assets. The clay brick façades of a neighboring school and old courthouse gave inspiration to the exterior design and detailing of the center's expansion.

the new building, including corbelled cornices, a Flemish bond pattern, and a checkerboard relief. Brick patterns are also extended inside the building to enhance the visitors' experience as well as to provide visual unity from exterior to interior spaces.

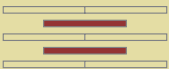
With its unique functional and aesthetic qualities, brick proved to be the one building material that could appropriately respond visually to the surrounding community. ■



Aesthetically, the design team sought to identify the new public entry, the importance of its civic function, and its openness to the visiting public. The use of turn-of-the-century brick detailing allowed the visual grouping of exterior windows to appear as an elegantly scaled complex element. At first glance, the cell windows combine to reflect a normalized building proportion even though they are designed to prevent escape. This illusion is reinforced by the adjacent fully glazed and non-secure administrative windows of the same size and proportion. A survey of brickwork in the adjacent historic district provided patterns and textures which were used on the elevations of



A survey of brickwork in the adjacent historic district provided patterns and textures which were used on the new building.



Architect:

HOK Architects

Principals:

James Kessler, AIA

Robert Karamitsos, AIA

Builder:

Tompkins Builders, Inc.

Mason Contractor:

J.D. Long Masonry, Inc.

Manufacturer:

Endicott Clay Products Company

Distributor:

Potomac Valley Brick and Supply Company

Photographer:

Daniel Cunningham



Walnut Street Park Imaginary Garden Walk Cary, North Carolina

Brick Pavers Add Color, Delight, and Permanence to a New City Park

The city of Cary, North Carolina built Walnut Street Park within an 11-acre infill neighborhood. On one side, a grassy area hosts a small playground while the other side contains woods and wetlands. To define the two spaces, the city commissioned a brick sculptor to design a public work of art installation, which is now the Imaginary Garden Walk. The highlight of the promenade is a design of brown and yellow pavers set within a background of deep red clay brick pavers. The design depicts a long, twisting vine that enters a large circular plaza, where it bursts into bloom.

Functionally, the promenade connects one end of the park to the other. Artistically, the floral design adds a level of playfulness and imagination to the park by evoking movement and nature. The brick patterns stand out thanks to the rich contrast and variety of



colors—hues that will remain vivid and striking long into the future. In addition, the pavers' smooth surface provides access for families who use strollers as well as for individuals in wheelchairs. The ease of future maintenance makes the choice of clay brick pavers fiscally responsible as well.

The project is specifically intended to respect and exhibit the environment. The clay brick pavers themselves represent a green building material as they are made of clay and water—two of the earth's most abundant raw materials. The durability of the pavers will also allow them to last for centuries.

The Imaginary Garden Walk is a place of tranquility and unity with nature, punctuated by elements of surprise and interest. More than just a path or sidewalk, it is something that attracts and holds interest through the changing of the seasons. The promenade has become a true community destination. ■



The brick patterns are made possible due to the variety of brick colors, which will remain permanent now and into the future.



Landscape Architect:

OBS Landscape Architects

Builder:

Fred Adams Paving Company, Inc.

Sculptor:

Barbara Grygutis Sculpture, LLC

Manufacturer:

Pine Hall Brick

Photographers:

Town of Cary

OBS Landscape Architects





Beauregard Condominiums Washington, D.C.

Playful Design Adds to Artistic Vibe in D.C. Industrialized Neighborhood

At the hub of Washington, D.C.'s thriving music scene, the neighborhood surrounding Beauregard Condominiums is one of the few industrially zoned areas. Located in the northwest quadrant of the city, the neighborhood has long been at the core of artistic innovation in the District. Given the character of its location, the project presented the potential for design freedom as well as an opportunity for playfulness. The final design deftly captured both the neighborhood's older industrial fabric and its artistic energy.

Although brick possesses a timeless and universal appeal, the design team also chose brick as the primary cladding material of the building for its durability and its insulating value.



The alternating use of black and maroon iron spot brick harkens back to the bygone factories of the early 20th century and serves to ground the building within the interplay of industrial and residential uses. Brick also played an important role in tempering the large expanses of glass. To achieve a sharp, machine-like appearance, the architects designed customized bricks in the corners and at the projections. The façade's signature projecting bays reference the city's classic row houses and apartment buildings. These projecting bays serve more than architectural flourishes: they provide stunning views from each unit.

As the building envelope serves as the building's first line of defense against the elements, brick was selected for its weather-resistant properties. For the condominium owners, brick's low maintenance qualities played a reassuring role.

Finally, the use of brick helped contribute to the building's LEED certification. Brick adds energy conservation and fire protection to the whole building by serving as a passive mode of heat absorption and by providing a fire barrier between houses. ■



Brick was an important element of the project to temper the large expanses of glass and to provide a residential feel to an industrial neighborhood.

Architect:

Sorg Architects

Principal:

Suman Sorg, FAIA

Builder:

Tompkins Builders, Inc.

Mason Contractor:

Tompkins Builders, Inc.

Manufacturers:

Carolina Ceramics Brick Company

Endicott Clay Products Company

Distributor:

Potomac Valley Brick and Supply Company

Photographer:

Roger Foley Photography

Renovation and Addition to 1930s Residence Washington, D.C.

Historic 1930s Residence Extends its Art Moderne Character with Contemporary, Green Redesign

The owners of this existing two-story historic residence sought to expand and fully renovate the structure. As committed historic preservationists, they set out to restore the architectural character of the original building and to extend the historic character throughout the completed project. To achieve this transformation, the architects crafted their designs according to four goals: to extend the order of the existing building by providing a clear organization for the expanded residence; to transition from the house to the lawn and garden through a new central space; to restore the existing lawn, garden, and building; and to implement energy-efficient and sustainable design measures.

White painted brick is the primary material of the existing house and is emblematic of its 1930s Art Moderne design. Painted brick, therefore, also became the principal material of the new construction, allowing the addition to appear to be a comfortable and natural extension of the existing structure. The painted brick was also the perfect primary material into which other materials could be introduced without conflict.

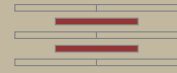
Several unique, sustainable elements were also incorporated into the house design, including a 16-well geothermal system to heat and cool the house. During summer, water is routed through paving-encased snow-melt tubing to absorb heat

and be reused as warm water in the swimming pool. Roof-mounted photovoltaic panels provide electric power, offsetting utility power consumption through net-metering. Finally, four 6,000-gallon underground tanks capture runoff from impervious surfaces; the rainwater is then used to irrigate the lawn and garden.

Brick construction not only helped make the owners' house fit comfortably into their neighborhood, but also contributed to the privacy, safety, and quiet that the owners desired in a home. ■



White painted brick allowed the new addition appear to be a comfortable and natural extension of the existing structure.



Architect:

Muse Architects

Principal:

Stephen Muse, FAIA

Builder:

Horizon Builders, Inc.

Mason Contractor:

B&B Masonry

Manufacturer:

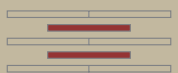
Lawrenceville Brick, Inc.

Distributor:

Potomac Valley Brick and Supply Company

Photographer:

Alan Karchmer,
Architectural Photographer



GOLD WINNERS

COMMERCIAL

Forest Lakes Pool Complex

Location: Santa Rosa Beach, Florida
 Architect: McWhorter Architects, P.A.
 Builder: S & L Homes, Inc.
 Manufacturer: Cherokee Brick and Tile Company
 Distributor: Jenkins Brick and Tile Company
 Mason Contractor: Sir Pig

Restaurant 3

Location: Arlington, Virginia
 Architect: MTF Architecture, Inc.
 Manufacturer: Endicott Clay Products Company
 Distributor: Potomac Valley Brick and Supply Company
 Mason Contractor: Wells & Associates, Inc.

EDUCATIONAL

East Hall at Worcester Polytechnic Institute

Location: Worcester, Massachusetts
 Architect: Cannon Design
 Manufacturer: Morin Brick
 Distributor: Spaulding Brick Company, Inc.
 Mason Contractor: Empire Masonry Corporation

Enotah Hall at Young Harris College

Location: Young Harris, Georgia
 Architect: Lord, Aeck & Sargent
 Builder: Hardin Construction Company, LLC
 Manufacturers: Cherokee Brick and Tile Company
 Hanson Brick
 Distributor: North Georgia Brick Company, Inc.
 Mason Contractor: Zebra Construction Company, Inc.

Holy Cross School

Location: New Orleans, Louisiana
 Architect: Blitch/Knevel Architects/Broadmoor Design Group
 Builder: Broadmoor Corporation
 Manufacturer: Acme Brick Company
 Mason Contractor: WT Construction, Inc.

Somerset Elementary School

Location: Chevy Chase, Maryland
 Architect: Muse Architects
 Distributor: Potomac Valley Brick and Supply Company
 Mason Contractor: Karon Masonry, Inc.

HEALTH CARE FACILITIES

Sacred Heart Medical Center at Riverbend

Location: Springfield, Oregon
 Architect: Anshen + Allen
 Builder: Turner Construction Company
 Mason Contractor: Davidson's Masonry, Inc.

HOUSES OF WORSHIP

Holy Spirit Catholic Church

Location: Atlanta, Georgia
 Architect: CDH Partners, Inc.
 Builder: Brasfield & Gorrie, LLC
 Manufacturer: Acme Brick Company
 Distributor: North Georgia Brick Company, Inc.
 Mason Contractor: Halloran Masonry, Inc.

MUNICIPAL/GOVERNMENT/CIVIC

Glendale Fire Station 151

Location: Glendale, Arizona
 Architect: DWL Architects + Planners, Inc.
 Builder: FCI Constructors, Inc.
 Distributor: Marvel Building and Masonry Supply
 Mason Contractor: G & G Enterprises

Public Building Commission Vehicle Maintenance Facility

Location: Chicago, Illinois
 Architect: TENG & Associates
 Manufacturer: Endicott Clay Products Company
 Mason Contractor: Walsh Construction Corporation

The Station at Potomac Yard

Location: Alexandria, Virginia
 Architect: Lemay Erickson Willcox Architects with Rust/Orling Architecture
 Builder: The Whiting-Turner Contracting Company
 Manufacturer: Hanson Brick
 Distributor: Potomac Valley Brick and Supply Company
 Mason Contractor: United Masonry Incorporated of Virginia

PAVING & LANDSCAPE ARCHITECTURE

Garden Gazebo

Location: Greenwich, Connecticut
 Architect: Hilton-VanderHorn Architects
 Landscape Architect: Charles J. Stick, Inc.
 Builder: World Wise Construction Management
 Manufacturer: Glen-Gery Corporation
 Mason Contractor: Mauro Fidaleo Construction, LLC

RESIDENTIAL – MULTI-FAMILY

Salvation Army Harbour Light

Location: Toronto, Ontario, Canada
 Architect: Diamond and Schmitt Architects
 Builder: The Atlas Corporation
 Manufacturer: I-XL Brick
 Mason Contractor: Vaughan Masonry, Inc.

RESIDENTIAL – SINGLE FAMILY

The Willow Lane Showhouse

Location: Birmingham, Michigan
 Architect: Dominick Tringali Architects
 Builder: Custom Homes by Derocher, Inc.
 Manufacturer: General Shale Brick
 Mason Contractor: KBH Masonry Contracting, LLC

SILVER WINNERS

COMMERCIAL

Buffalo Grove Bank & Trust

Location: Buffalo Grove, Illinois
 Architect: Melichar Architects
 Builder: Valenti Builders
 Manufacturer: Redland Brick, Inc.
 Distributor: Illinois Brick Company
 Mason Contractor: Illinois Masonry Corporation

Liberty Hotel

Location: Boston, Massachusetts
 Architect: Cambridge 7 Associates, Inc.
 Associate Architect: Ann Beha Architects
 Manufacturer: Endicott Clay Products Company
 Distributor: Spaulding Brick Company, Inc.
 Mason Contractor: Phoenix Bay State Construction Company, Inc.

EDUCATIONAL

The James P. Muldoon River Center at

St. Mary's College of Maryland

Location: St. Mary's City, Maryland
 Architect: Muse Architects
 Builder: KBE Building Corporation
 Manufacturer: Redland Brick, Inc.
 Distributor: Potomac Valley Brick and Supply Company
 Mason Contractor: Lacey Construction

Morrill Hall Renovation at Iowa State University

Location: Ames, Iowa
 Architect: RDG Planning & Design
 Mason Contractor: Renaissance Restoration, Inc.

New Graduate Student Residence Hall at

Columbia Theological Seminary

Location: Decatur, Georgia
 Architect: Lord, Aeck & Sargent
 Builder: New South Construction, Inc.
 Manufacturer: Hanson Brick
 Distributor: North Georgia Brick Company, Inc.
 Mason Contractor: Cornerstone Masonry, Inc.

HEALTH CARE FACILITIES

Methodist Stone Oak Hospital

Location: San Antonio, Texas
 Architect: HOK Architects
 Builder: Skanska USA Building
 Manufacturer: Glen-Gery Corporation
 Distributor: Brick Selections
 Mason Contractor: Brazos Masonry, Inc.

HOUSES OF WORSHIP

St. Sylvester Catholic Church

Location: Gulf Breeze, Florida
 Architect: Quina Grundhoefer Architects, P.A.
 Builder: Greenhut Construction Company, Inc.
 Manufacturer: Carolina Ceramics Brick Company
 Distributor: W.R. Taylor & Company
 Mason Contractor: Bradley Masonry, Inc.

MUNICIPAL/GOVERNMENT/CIVIC

Wilson Aquatic Center

Location: Washington, D.C.
 Architect: Hughes Group
 Manufacturer: Redland Brick, Inc.
 Distributor: Potomac Valley Brick and Supply Company
 Mason Contractor: Sigal Construction Corporation

The 2010 Brick in Architecture Award Winners

PAVING & LANDSCAPE ARCHITECTURE

Justison Landing

Location: Wilmington, Delaware
Landscape Architect: Oasis Design Group
Builder: Delaware Department of Transportation
Manufacturer: Pine Hall Brick
Mason Contractor: GrassBusters Landscaping & Irrigation

Kenmore Square Surface Improvements

Location: Boston, Massachusetts
Landscape Architect: Pressley Associates
Builder: The Barletta Companies
Associate Architect: Dimella Shaffer Associates
Manufacturer: Boral Bricks, Inc.
Distributor: Spaulding Brick Company, Inc.
Mason Contractor: Dependable Masonry Construction Company

RESIDENTIAL – MULTI-FAMILY

Meridian at Grosvenor Station

Location: North Bethesda, Maryland
Architect: Lessard Urban, Inc.
Manufacturer: Carolina Ceramics Brick Company
Distributor: Potomac Valley Brick and Supply Company
Mason Contractor: J.D. Long Masonry, Inc.

RESIDENTIAL – SINGLE FAMILY

Friedman Residence

Location: Houston, Texas
Architect: L. Barry Davidson Architects AIA, Inc.
Builder: Pyramid Constructors, LLP
Manufacturer: Redland Brick, Inc.
Mason Contractor: R.G.C. Masonry Company

BRONZE WINNERS

COMMERCIAL

Hilton Garden Inn

Location: Arlington, Virginia
Architect: Awbrey Cook McGill
Manufacturers: The Belden Brick Company
Carolina Ceramics Brick Company
Distributor: Potomac Valley Brick and Supply Company
Mason Contractor: Pompano Masonry Corporation

Long & Foster Headquarters

Location: Chantilly, Virginia
Architect: Beery Rio
Manufacturer: Redland Brick, Inc.
Distributor: Potomac Valley Brick and Supply Company
Mason Contractor: Falls Church Construction Corporation

Monon Greenway Bridge

Location: Carmel, Indiana
Architect: CSO Architects
Manufacturer: Glen-Gery Corporation
Distributor: Edgewood Building Supply
Mason Contractor: Batts Construction, Inc.

EDUCATIONAL

Founders Hall at Juniata College

Location: Huntingdon, Pennsylvania
Architect: Street Dixon Rick Architecture, PLC
Builder: Leonard S. Fiore, Inc.
Manufacturer: Glen-Gery Corporation
Mason Contractor: Fahr Masonry, Inc.

Kent Denver Student Center for the Arts

Location: Englewood, Colorado
Architect: Semple Brown Design, P.C.
Builder: CMC Group, Inc.
Manufacturers: Robinson Brick
Endicott Clay Products Company
Mason Contractor: Glover United Masonry, Inc.

Ocean Science and Exploration Center at University of Rhode Island

Location: Narragansett, Rhode Island
Architect: Burt Hill
Builder: Gilbane, Inc.
Manufacturer: Endicott Clay Products Company
Distributor: Spaulding Brick Company, Inc.
Mason Contractor: M.F. Construction Corporation

Saint Theresa Education Center

Location: Sugar Land, Texas
Architect: Duncan G. Stroik Architect
Builder: EE Reed Construction
Associate Architect: Jackson & Ryan
Mason Contractor: W.W. Bartlett, Inc.

Scandling Campus Center at Hobart and William Smith College

Location: Geneva, New York
Architect: KSS Architects
Builder: The Pike Company
Manufacturer: Redland Brick, Inc.
Distributor: Weckesser Brick Company, Inc.
Mason Contractor: F.G. Rayburn Mason Contractors, Inc.

University of Oklahoma Gaylord Hall College of Journalism & Mass Communications

Location: Norman, Oklahoma
Architect: Rees Associates, Inc.
Manufacturer: Acme Brick Company
Mason Contractor: Advanced Masonry, Inc.

University of Massachusetts Amherst Integrated Sciences Building

Location: Amherst, Massachusetts
Architect: Payette
Builder: Gilbane, Inc.
Manufacturers: Morin Brick
The Belden Brick Company
Distributor: Spaulding Brick Company, Inc.
Mason Contractor: Chabot & Burnett Construction Company, Inc.

Washington-Lee High School

Location: Arlington, Virginia
Architect: Grimm + Parker Architects
Builder: Hess Construction
Manufacturers: Taylor Clay Products, Inc.
Carolina Ceramics Brick Company
Endicott Clay Products Company
Distributor: Potomac Valley Brick and Supply Company
Mason Contractor: Karon Masonry, Inc.

Westminster School Armour Academic Center

Location: Simsbury, Connecticut
Architect: GUND Partnership
Builder: Bartlett Brainard & Eacott, Inc.
Manufacturer: The Belden Brick Company
Mason Contractor: B.W. Dexter II, Inc.

HEALTH CARE FACILITIES

North Arkansas Regional Medical Center

Location: Harrison, Arizona
Architect: Polk Stanley Wilcox Architects
Builder: Nabholz Construction
Manufacturer: Acme Brick Company
Mason Contractor: DMG Masonry and Plaster, Ltd.

MUNICIPAL/GOVERNMENT

North Richland Hills Library

Location: North Richland Hills, Texas
Architect: BRW Architects
Builder: Steele & Freeman, Inc.
Manufacturer: Acme Brick Company
Mason Contractor: Pryor & Pryor Masonry, Inc.

Rose Haggar Park Pavilion

Location: Dallas, Texas
Architect: Richter Architects
Builder: Phoenix Restoration
Manufacturer: Acme Brick Company
Mason Contractor: In-Co Masonry

RESIDENTIAL – MULTI-FAMILY

54 Phila Street Condominiums

Location: Saratoga Springs, New York
Architect: Olsen Associates Architects
Builder: Terrace Homebuilders
Manufacturer: Watsontown Brick Company
Mason Contractor: AJS Masonry, Inc.

The Visio & Murano

Location: Washington, D.C.
Architect: Sorg Architects
Builder: Robertson Development
Manufacturer: Glen-Gery Corporation
Mason Contractor: Tompkins Builders, Inc.

RESIDENTIAL – SINGLE FAMILY

HandMade House

Location: Asheville, North Carolina
Architect: Samsel Architects, P.A.
Builder: Biltmore Farms Homes, LLC
Manufacturer: Redland Brick, Inc.
Mason Contractor: C&R Masonry

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



web

Scan the code to see more pictures in the Brick Photo Gallery. To download a free mobile application, go to <http://scan.mobi> on your mobile device or text 'SCAN' to 72267.

Use the following learning objectives to focus your study while reading the article below. To receive credit, follow the instructions found at the end of the article which direct you to complete the AIA questionnaire found at www.gobrick.com/ArchitectCredit.

Learning Objectives

After reading this article you should be able to:

1. Know the submittals and shop drawings associated with brickwork
2. Distinguish between different brick panels and the purpose of each
3. Understand how brick and mortar must be prepared for construction
4. Understand how brickwork is constructed and cleaned

Construction administration (CA) encompasses several activities which ensure that the final design is constructed according to the plans and specifications. While CA entails administrative work and follow-up which is not part of the design process, architects should strongly urge their clients to include this phase of the project in their scope of work. Why? For two primary reasons. First, CA helps minimize problems and issues that can result in building owner dissatisfaction before the final project is completed. Second, CA by the architectural firm increases the odds that the final project meets, and exceeds, the expectations of the building owner.

The full scope of CA services on a project involves much more than can be addressed in this article. However, this article does cover the CA activities associated with brick veneer that the CA professional should consider to achieve beautiful brickwork with uncompromising performance.

BEFORE CONSTRUCTION

Brick Selection. Prompt selection of the brick will allow more time for the contractor to place the order with the distributor or manufacturer. This is particularly important if the brick selected are not in stock, which will result in the manufacturer making a production run of the brick for the project. More time is especially important when special shapes are specified. If brick with two or more finished faces or ends are needed for the project, additional time will likely be required to fill the order.

Submittals. The brick selected for the project should be confirmed by a submittal. Brick attributes should be verified for each brick selected for the project and should include strength, color, texture, size, and shape. A sample of no fewer than five individual brick, showing extreme variations in color and texture, a test report, and certificate of compliance should be submitted for review and approval. The test report should include compressive strength, 24-hour cold water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (IRA). The certificates of compliance should verify that each brick meets the applicable ASTM specification for grade, type, or class as dictated by the project specifications.

All testing should be done in accordance with ASTM test methods. A test report from an independent testing laboratory, supplied by the manufacturer, should be considered current if it is 24 months old or less. The cost of the test is borne by the seller. If testing of the production run that is intended for shipment to the project is required, the cost of testing is typically borne as follows: if the results of the tests show that the brick do not conform to the requirements of the product specification, the cost is typically borne by the seller; if the results of the tests show that the brick conform to the requirements of the product specification, the cost is borne by the purchaser. The cost of any additional testing is typically borne by the purchaser.

Shop Drawings. For each special shape brick required on the project, the contract documents should include detailed large-scale drawings. These drawings should be reviewed by the manufacturer to assess the feasibility of manufacturing each special shape. Once reviewed, the manufacturer prepares shop drawings of each special shape showing its configuration and dimensions. Notes indicating the finished faces of the brick are shown. Shop drawings are often prepared for each brick in an arch showing the shape of each

vousoir needed. The shop drawings are then submitted to the architect for review and approval.

Storage. Masonry materials at the job site should be stored to avoid contamination. Masonry units, mortar materials, ties, and reinforcement should be stored off the ground, preferably in a dry location. In addition, all materials should be covered with tarpaulins or other weather-resistant materials to protect them from the elements. Sand should be located such that water does not drain under or into it. Careless storage of masonry materials can increase the likelihood of efflorescence and increase the cost of laying masonry. This is especially true if construction occurs during a wet winter and thawing or removal of ice and snow from masonry units is necessary before being laid.

SAMPLES AND MOCK-UPS

While the terms “sample board,” “sample panel,” and “mock-up panel” are sometimes used interchangeably, they are different and serve different purposes.

Sample Board. A sample board consists of 15 brick that are not full width but are generally only about ½ in. (12.7 mm) thick showing the face of the brick only. The purpose of a sample board is to display the brick and give a broad, general idea of how they will appear in the finished brickwork. Its use is limited to selecting a representative brick for a given project and should not be used to judge the workmanship or finished brickwork.

Sample Panel. A sample panel, sometimes referred to as a field panel, is a section of brickwork measuring a minimum of 4 ft (1.2 m) long by 4 ft (1.2 m) high. A typical sample panel constructed of a modular-size brick will contain 108 full-size brick. The purpose of

the sample panel is to show the full color and texture range of the brick and mortar and the workmanship that will be used on the project. The materials and procedures used in the sample panel should be those specified for the project. Other products or activities that affect the look of the brickwork, such as coatings, sealants, and cleaning, should also be applied to the sample panel to judge its acceptability.

Where the brick or mortar color for a project have not been selected, it may be necessary to construct a separate panel for each type of brick or mortar under consideration. Keep in mind that there are no industry standards for brick veneer when it comes to workmanship. Brickwork with unaligned head joints and non-uniform mortar joint widths is considered acceptable.



Figure 1. Sample Panel

Mock-Up Panel. A mock-up panel typically is larger in scale than a sample panel and usually includes the installation of flashings, wall ties, expansion joints, lintels, shelf angles, and other accessory items. It may also include unique or special details such as soldier or band courses and windows. All materials and procedures should comply with the project specification and should be performed by the contractor responsible for that portion of work. The purpose of the mock-up panel is to show the workmanship, full color and texture range of the brickwork, all accessories, and how the brickwork and accessories integrate with each other and other building elements.

Sample and mock-up panels should be constructed from the brick production run that is intended for shipment to the project. In the event that the panel must be constructed and approved before the brick production run for that project, the owner and the manufacturer or distributor should agree in writing upon such a use. Sample and mock-up panels should incorporate into the panel construction all of the brick supplied by the manufacturer or distributor. This is important to ensure that the panel is representative of the final brickwork. Omitting some brick supplied by the manufacturer or distributor for the panel will not result in a panel representing the final brickwork. Sample and mock-up panels should remain on

the job site and not be moved or destroyed until the brickwork is completed and accepted.

DRAINAGE WALL CONSTRUCTION

The most common wall which uses brick is the drainage wall. The drainage wall assumes a heavy, wind-driven rain may penetrate the brick veneer. If it does, the wall is designed to allow the water to flow down the back face of the brick veneer within the air space, where it is collected on the flashing and redirected out of the wall system through the weeps.



Figure 2. Mock-Up Panel

Water-Resistant Barrier. A water-resistant barrier is imperative on the exterior sheathing of wood or steel framing in a drainage wall system. It is placed over the sheathing as a secondary measure to prevent the passage of liquid water to underlying materials susceptible to moisture damage. A water-resistant barrier should prevent water which finds its way across the air space via anchors, mortar bridging, or splashing from entering the substrate. A water-resistant barrier is required in exterior walls when brick veneer is anchored to wood or steel framing, and can be provided by No. 15 asphalt felt or other approved materials.

Air Space. It is essential that the air space be kept as clean as possible in a drainage wall system. If it is not, mortar droppings may clog the weeps, protrusions may span the air space, and water penetration to the interior may occur. To the greatest extent possible, mortar droppings should be prevented from falling into the air space or cavity.

Flashing. Flashing is a critical element when draining water from the wall system. Flashing should be durable to resist puncture and cracking before and during construction. Flashing must be installed properly and integrated with adjacent materials to form an impervious barrier to moisture movement. Flashing should be wide enough to start on the outside face of the brick veneer, extend through the brick veneer and across the air space, and turn up vertically against the backing. Under no circumstances should the flashing be stopped behind the face of the brickwork. Sections of flashing should be overlapped at least 6 in. (152 mm) and the lap sealed with a compatible adhesive. Continuity at corners and returns is achieved by cutting and folding straight sections or using preformed corner pieces. Discontinuous flashing should terminate with an end dam in a head joint, rising at least 1 in. (25.4 mm).

Weeps. Locate weeps in mortar joints immediately above the flashing. Open head joints, formed by leaving mortar out of a vertical head joint, are the recommended type of weep. The practice of specifying the installation of weeps one or more courses of brick above the flashing can cause a backup of water and is not recommended. Spacing of open head joint weeps at no more than 24 in. (610 mm) on center is recommended. Spacing of wick and tube weeps is recommended at no more than 16 in. (406 mm) on center. The weep should be clear of all mortar to allow the wall to drain. Rope wicks should be flush with or extend ½ in. (12.7 mm) beyond the face of the wall to promote evaporation. The rope should continue into the bottom of the air space, placed along the back of the brick and be at least 16 in. (406 mm) long.

BRICK PREPARATION

Brick delivered to the job site should be verified to meet the appearance requirements of the brick in the approved sample or mock-up panel. Prepare brick to be placed in the veneer by blending and wetting as necessary.

Blending. To enhance the distribution of the brick throughout the brickwork, the brick should be blended at the job site. Because brick is made from natural materials that vary in physical properties, variations in color may occur between production runs and occasionally within the same run. Modern manufacturing processes use automatic equipment which may not permit inspection of each brick, also resulting in minor color and texture variations. For these reasons, straps of brick from different cubes should be placed together around the wall. The mason should then select brick from adjacent straps when laying a given section of brickwork. By blending the brick throughout the wall in this manner, the effect of potential color variations on the finished brickwork is minimized.

Wetting. Proper preparation of the brick prior to placement in the wall may require pre-wetting of the units. Brick with an initial rate of absorption (IRA) greater than 30 g/min • 30 in.² (30 g/min • 194 cm²) at the time of laying tend to draw too much moisture from the mortar before initial set. As a result, construction practices should be altered when using brick with high IRA to achieve strong, water-resistant masonry. The IRA of brick in the field will typically be less than that reported in laboratory tests provided in the submittals previously discussed. A crude method of indicating whether the brick on the project need to be wetted prior to placement consists of drawing, with a wax pencil, a circle 1 in. (25.4 mm) in diameter on the brick surface that will be in contact with the mortar. A quarter can be used as a guide for the circle. With a medicine dropper, place 20 drops of water inside this circle and note the time required for the water to be absorbed. If the time exceeds 1-½ minutes, the brick should not need wetting; if less than 1-½ minutes, adjustments to typical construction practice are recommended.

If brick are to be wetted, the method of wetting is very important. Sprinkling or dipping the brick in a bucket of water just before laying would produce the surface wet condition which may not be sufficient. The units should have a saturated interior, but be surface dry at the time they are laid. Satisfactory procedures for wetting the brick consist of allowing water to run on the cubes or pallets of brick, or placing them in a large tank of water. This should be done the day before the units are laid, or not later than several hours before the units will be used so that the surfaces have an opportunity to dry before the brick are laid. Wetting low-absorption brick or excessive wetting of brick may result in saturation. This can cause “bleeding” of the mortar joints and the mason may feel the brick “float” as they are laid.

MORTAR PREPARATION

Mortar should comply with ASTM C270 *Standard Specification for Mortar for Unit Masonry* and should be specified by either proportion or property. Proportion specifications require that mortar materials be mixed according to volumetric proportions. If mortar is specified by this method, no laboratory testing is required, either before or after construction. Property specifications require that mortar meet the specified properties under laboratory testing conditions. If mortar is specified by property specifications, compressive strength, water retention, and air content tests must be performed prior to construction on mortar mixed in the laboratory with a controlled amount of water. The material proportions of the mortar are determined from the laboratory testing and then used to mix the mortar in the field with the amount of water determined by the mason. Properties of field-mixed mortar cannot be compared to the requirements of the property specifications because of the different amounts of water used in the mortars, the different mixers used, and the different curing conditions. Field sampling of mortar, where specified, is typically performed for tracking project consistency from beginning to end and should not be used to verify compliance with the requirements of property specifications. Mortar should be specified to balance the construction requirements with the performance of the completed masonry.

Mixing. Although most mortar is mixed on-site, preblended mortar is available and is an acceptable alternative to site-mixing. Preblended mortar is supplied in consistent proportions without the need for on-site batching and measurement controls. While each mortar type has specified ranges of material quantities, accurate and consistent material quantities are desired throughout the job. Regardless of whether site-mixed or preblended, all cementitious materials and aggregates must be mixed for at least 3 minutes and not more than 5 minutes in a mechanical batch mixer.

Retempering. Adding water to mortar after it is mixed is a practice commonly referred to as retempering. Mortar should have a high water-to-cement ratio since absorbent brick wick water away from the mortar upon contact. This wicking action is important because it also draws some of the mortar into the brick, thus increasing the extent of bond between the brick and mortar. Retempering mortar is important because the high water-to-cement ratio changes

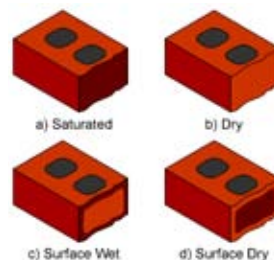


Figure 3. Moisture Content of Brick

over time as water evaporates from the mortar. If, after initial mixing, the mortar stiffens due to the loss of water by evaporation, additional water should be added and the mortar remixed (retempered). Caution should be exercised with colored mortar as the color of the mortar may be affected by retempering. All mortar should be used within 2-½ hours of adding the initial mix water into the mixer and no mortar should be used after it has begun to set.

Measuring. Material measuring and batching should be by volume or by weight to ensure that the specified mortar proportions are accurately controlled and maintained. Larger projects typically use an on-site mortar silo to measure the dry mortar ingredients. Silo mixers meter materials mechanically, producing a consistent mortar mix without shovels and bags. If mortar constituents are measured without a silo, cement and lime should be placed in the mixer in whole (preferably) or half bags. Sand can be measured with a 1-cubic foot (0.028 m³) box or a 5-gallon bucket equal to ⅔-cubic feet (0.019 m³).

As an alternative to measuring each charge of sand with a box or bucket, the sand can be measured by counting the number of shovels of sand. If this is done it is imperative that the number of shovels of sand required to fill the box or bucket be determined or recalibrated on a regular basis. This is important because the number will change depending on the moisture content of the sand, the size of the shovel, and the worker shoveling. The number of shovels of sand to fill the box or bucket should be recalibrated every morning and afternoon or whenever the size of the shovel or worker shoveling the sand is changed.

If sand is measured by counting the number of shovels of sand added to the mixer and the shovel count is not recalibrated on a regular basis, the proportions of sand in the mortar may not be correct and oversanding of the mortar may result. Oversanded mortar is harsh, unworkable, and results in poor extent of bond and reduced bond strength, thus increasing the potential for water penetration problems.

Laboratory Testing. When the property specification of ASTM C270 is used, laboratory testing is necessary to establish mortar mix proportions. These proportions are then used to prepare the mortar which will be used in the field to assemble the brickwork. Laboratory testing for the proportion specification of ASTM C270 is not necessary.

Field Testing. Regardless of whether mortar meets the proportion or property specification of ASTM C270, field testing of mortar is not necessary on most projects. If the approved materials are accurately measured when added to the mixer, that is all that is required according to the ASTM C270 specification. If observation of mortar mixing to verify compliance with the proportions is not possible, some physical testing of field-sampled mortar by ASTM C780 *Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry* may be appropriate to verify mortar proportions or consistency. The Mortar Aggregate Ratio Test Method found in ASTM C780 is the best method to determine the proportions of field-mixed mortar. In addition, the results are available immediately.

CONSTRUCTION OF BRICKWORK

Brickwork progresses as the mason spreads the mortar bed, takes a brick, butters its end with mortar, and shoves it in to form the brickwork.

Set Up and Protection. Brickwork should be protected during construction. Scaffolding should be erected far enough away from the wall to allow mortar droppings to fall to the ground. Scaffold boards closest to the wall should be angled away from the wall or removed at the end of the day to remove excess mortar droppings and prevent rain from splashing mortar and dirt directly onto the completed brickwork. Spreading out straw, sand, sawdust, plastic sheeting, or fabric on the ground at the base of the wall can protect the wall surface from rain-splashed mud and mortar splatter and should be kept in place until final landscaping. It is important to cover wall openings and tops of walls with a waterproof membrane at the end of the workday and at other work stoppages to prevent mortar joint washout and entry of water into the completed masonry.

Brick. Since brick can potentially break or chip during transit and handling, the mason should briefly observe each brick before it is laid. Brick that do not meet chippage and

tolerances of the applicable ASTM standard for the grade, type, or class of brick should be culled and not placed in the wall.

Joints. All mortar joints that are designed to receive mortar should be completely filled. Improperly filled mortar joints can result in leaky walls, reduce the strength of masonry, and may contribute to disintegration and cracking due to water penetration and subsequent freezing and thawing. A uniform bed of mortar should be spread over only a few bricks, and furrowed lightly, if at all. After brick placement, mortar squeezed out of bed joint should be cut off prior to tooling. Brick should be laid within 1 minute or so after the mortar is placed. The length of time between placing the bed joint mortar and laying the succeeding brick influences the resulting bond. If too long a time elapses, poor extent of bond will result.

A head joint is the vertical mortar joint between two brick. It is important that head joints be completely filled. The best head joints are formed by completely buttering each edge of the end of the brick with mortar. Then the brick is shoved into place against the previously laid brick so that mortar is squeezed out of the top of the head joint. “Slushing” (“throwing” mortar into the joint with the trowel) does not adequately fill joints or compact the mortar, resulting in joints that are less resistant to water penetration.

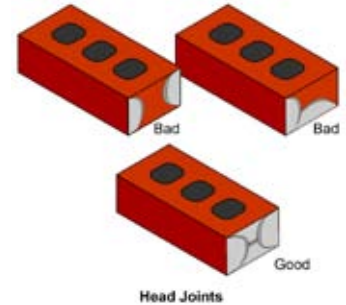


Figure 4. Head Joints

Masonry Anchors. Veneer anchors must conform to the project specifications. Masonry anchors should be made from stainless steel or carbon steel with a corrosion-resistant coating. Anchors should be placed so that they extend into the brick veneer a minimum of 1-½ in. (38.1 mm) and should have at least ⅝ in. (15.9 mm) of mortar cover to the outside face of the veneer. When anchors are installed, excessive bending should be minimized. Vertical offset between eye and pintle anchors should be no more than 1-¼ in. (31.8 mm).

Placement of anchors should be such that the maximum horizontal and vertical spacing is not exceeded and the number of anchors per wall area is met. Additional anchors must be installed around the perimeter of openings and adjacent to expansion joints. These requirements should be included in the project specifications.

Striking. Proper tooling, commonly referred to as “striking,” of mortar joints seals the wall surface against moisture penetration. Mortar joints should be tooled when they are “thumbprint” hard (pressing the thumb into the mortar leaves an indentation, but no mortar is transferred to the thumb) with a jointer slightly larger than the joint. It is important that joints are tooled at the appropriate time as this affects both their effectiveness and appearance. Joints that are tooled too early often smear and result in rough joints. If tooling is delayed too long the surface of the joint cannot be properly compressed and sealed to the adjacent brick. Each portion of the completed brickwork should be allowed to cure until “thumbprint” hard before tooling in order to ensure a uniform mortar shade. Early tooling often results in joints of a lighter color while tooling later results in darker shades.

Hot or Cold Weather. Normal weather conditions for installing brick and mortar are temperatures between 40 °F and 100 °F (4.4 °C and 37.8 °C) or 90 °F (32.3 °C) with a wind velocity greater than 8 mph (12.9 km/hr). When brickwork is constructed in hot or cold weather, building codes require additional measures to ensure its quality. In hot weather, masonry materials must be cool, mortar must be used within 2 hours of initial mixing, retempering mortar is required to maintain consistency, and wet curing or fog spraying may be required. In cold weather, masonry materials must be warmed as necessary, particularly if ice is present on or in the materials; brick units with ice or snow on the bedding surfaces must not be laid. Brickwork must be protected a minimum of 24 hours after installation so that it maintains enough heat for hydration of the cement in the mortar. Most importantly, antifreeze compounds (automotive antifreeze) must not be used. Antifreeze admixtures are alcohols or combinations of salts. If used in the quantities required to be effective, the performance of the brickwork usually suffers.

EXPANSION JOINTS

Brickwork should be divided into segments by expansion joints to prevent cracking. Expansion joints should be formed by leaving a continuous unobstructed opening through the brick veneer that may be filled with a highly compressible material. Expansion joints should accommodate expansive movement by the brick veneer while resisting water penetration and air infiltration.

Vertical Expansion Joints. For brickwork without openings, vertical expansion joints should be spaced at no more than 25 ft (7.6 m) on center. For brickwork with multiple openings, vertical expansion joints should be spaced at a maximum of 20 ft (6.1 m) on center. A pre-molded foam or neoprene pad can extend through the full brick veneer thickness to increase water penetration resistance and help to keep mortar or other debris from clogging the joint. Fiberboard and similar materials are not suitable for this purpose because they are not as compressible and should not be arbitrarily substituted in the field by the contractor. Mortar, ties, or wire reinforcement should not extend into or bridge the expansion joint. If this occurs, movement will be restricted and the expansion joint will not perform as intended. It is not necessary to interrupt shelf angles at vertical expansion joint locations. Expansion joints should be formed as the wall is built. However, vertical expansion joints may be cut into existing brickwork as a remedial action should they be inadvertently omitted during construction of the brickwork.

Horizontal Expansion Joints. A horizontal expansion joint should be located below each shelf angle to allow for vertical expansion of the brickwork below and deformation of the shelf angle and the structure. If the shelf angle is not attached to the structure when the brick below it are laid, any temporary shims that support the angle must be removed after the shelf angle is connected. The joint should then be formed by a clear space or highly compressible material placed beneath the angle, and a backer rod and sealant at the toe of the angle to seal the joint. However, shelf angles must be discontinuous to provide for their own thermal expansion. A space of ¼ in. between each section of angle is typically sufficient for every 20 ft (6.1 m) length of shelf angle.

Lipped Brick. A lipped brick course allows movement while minimizing the visual impact of a horizontal expansion joint. The lipped brick special shape should be made by the brick manufacturer for quality assurance purposes. Construction using lipped brick requires careful consideration of the frame movements noted previously. A minimum ¼ in. (6.4 mm) space should be provided between the shelf angle and the brick course immediately below it. Contact should not occur between the lipped brick and the brickwork below the shelf angle or between the lip of the brick and the shelf angle, not only during construction, but also throughout the life of the building. If the lipped brick is detailed to be installed inverted and placed on the last course of brickwork below a shelf angle, it is likely that any temporary shims used to support the shelf angle may be left in place.

CLEANING BRICKWORK

Improper cleaning practices can negatively impact a potentially award-winning project and result in a host of problems that, in a severe case, cannot be repaired without demolition and reconstruction of the brickwork. The appropriate cleaning method and cleaning solution should be matched to the type of brick, mortar, and other masonry materials used in the

project. The cleaning procedure recommended by the brick manufacturer in their brick cube identification card or literature should be followed. Cleaning solutions should be applied explicitly following the solution manufacturer's directions.

The contractor should remove large mortar pieces and clean the masonry as it is erected. New brickwork should be cleaned as soon as possible after mortar hardens, typically 7 days. Unbuffered muriatic acid should not be used as a cleaning solution. The brickwork to be cleaned and the brickwork below it should be thoroughly saturated with water prior to application of a cleaning solution. Clean from the top of the wall section to the bottom. Cleaning solution should not be applied to dry on brickwork. The cleaning method and solution should be tested on a 20 ft² (2 m²) sample area. Once the area has dried completely, the brickwork should be evaluated.

Bucket and Brush. Bucket and brush hand cleaning is the preferred method to clean brick masonry. This cleaning method is applicable to virtually all brick types. Thoroughly saturate the area to be cleaned and brickwork below with water prior to application of cleaning solution. Keep brickwork wet until final rinse. Using the bucket and brush method with water only is the least aggressive. If a cleaning solution is used, it should be recommended by the manufacturer of the brick. Typically, a long-handled stiff fiber brush or other type as recommended by the cleaning solution manufacturer is used. Metal brushes should not be used as they may damage mortar joints or result in staining. If a cleaning solution is used, the brickwork should be thoroughly saturated with water before application. The chemical reaction of the cleaning solution, rather than the scrubbing action of the brush, should be relied upon to clean the brick surface. As always, the cleaning manufacturer's instructions should be closely followed.

Pressure Washing. Pressurized water cleaning has become the more common method of cleaning new brickwork. Maintain a distance of 6 to 8 in. (150 to 200 cm) from the brickwork and use uniform horizontal strokes. Thoroughly saturate the area to be cleaned and brickwork below with water prior to application of cleaning solution. Keep brickwork wet until final rinse. Apply cleaning solution according to manufacturer's instructions with a low-pressure sprayer, 30 to 50 psi (200 to 350 kPa) using a 50° fan-shaped sprayer, or by brush. Do not use high pressure to apply cleaning solution. Do not allow cleaning solution to dry on brickwork. Thoroughly rinse using a maximum water pressure of 200 to 300 psi (1,400 to 2,100 kPa) with a 25° to 50° fan-shaped tip. The effects of pressurized water cleaning on each project or type of brick should be carefully considered as excessive pressure may damage brick surfaces, erode mortar joints, and remove finishes or other surface coatings, resulting in a different appearance. Always consult the brick manufacturer before allowing the use of pressurized water to clean brick.

Summary

The construction administration of brickwork on a project is crucial to its performance and appearance. Recommended activities generally include review of submittals and a sample or mock-up panel, observation of proper brick and mortar preparation, and observation of proper construction and cleaning techniques. Applying these recommendations will help ensure beautiful, durable brickwork.

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 the construction administration of brickwork, refer to the following *Technical Notes* at www.gobrick.com:

- *Technical Note 1* Hot and Cold Weather Construction
- *Technical Note 7B* Water Penetration Resistance—Construction and Workmanship
- *Technical Note 8* Mortars for Brickwork
- *Technical Note 18A* Accommodating Expansion of Brickwork
- *Technical Note 20* Cleaning Brickwork



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For questions, contact Megan Seid
at mseid@bia.org or 703.674.1535.



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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