



Architectural Enhancement: Aesthetical Design With Concrete Masonry

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AIA/CES Course #: 000530

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Learning Objectives

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At the end of this program, participants will know:

- Proper application of aesthetic design measures into concrete masonry wall systems
- Features of recent award winning projects
- Sustainable attributes of concrete masonry
- Specifications, tolerances and other requirements for concrete masonry construction

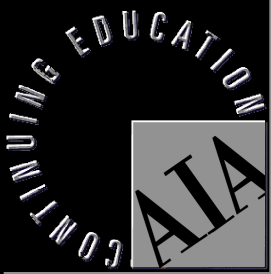


Design Awards

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Those projects which receive a design award are deemed superior to other projects by your peers.

Award-winning Concrete Masonry Projects appear in the eyes of the Judicial Team better than all others in their respective category.

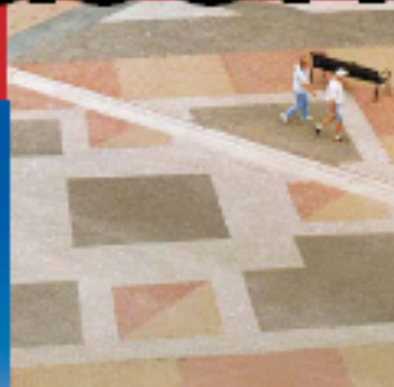


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DESIGNS

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2002 NCMA
DESIGN AWARDS
OF EXCELLENCE

College

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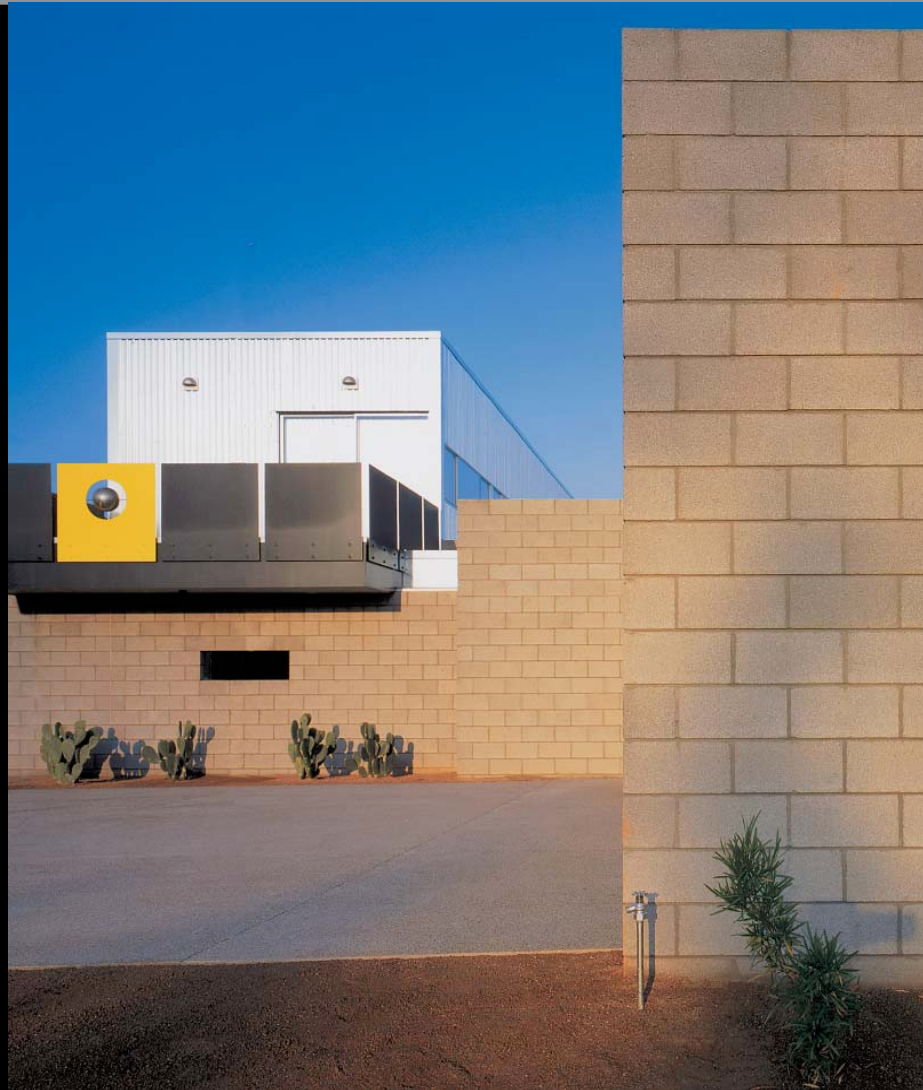
Business District and College Link Streetscape

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Gray Block and Sunlight

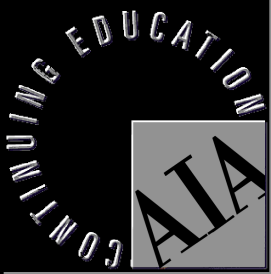
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Stunning Visual Effect

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Concrete Masonry



DESIGNS



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LEED Certified

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Community College, LEED Certified

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Inspiration

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Training Facility

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Training Facility

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Residential Strategy

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Inventive Architecture

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Inventive Architecture

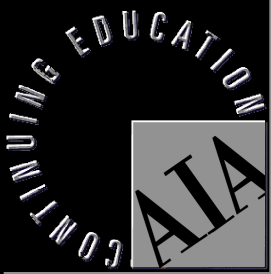
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Hillside Dream Home

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Hillside Dream Home

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Landscape Excellence

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Landscape Excellence

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Clients and Aesthetics

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A common dilemma faced by the Architectural Community is a Client's changing expectations and response relative to the project's appearance over time and under varying conditions.

There are references to model building codes and specifications which can assist in laying the ground rules applicable to all parties.

They assume an understanding and application of the techniques unique to the nature of Masonry by all parties.



Masonry and the Bottom Line

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Concrete Masonry continues to be cost-competitive to within approximately +/- 5% of other construction materials and methods.

Architectural Concrete Masonry Units

TEK 2-3A

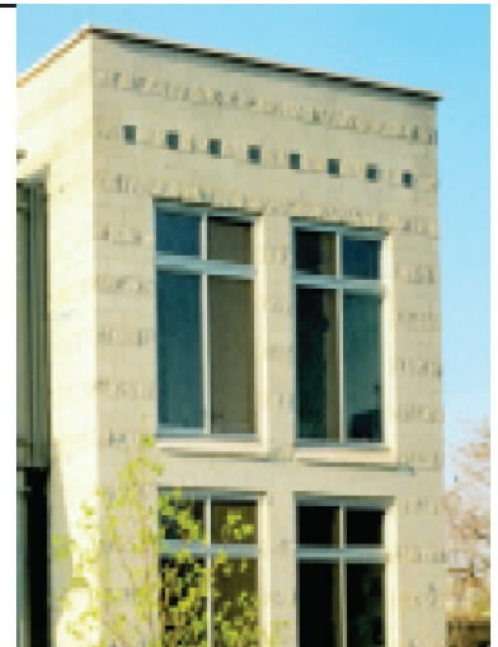
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(a) Split Face and Glazed



(b) Fluted Split Face



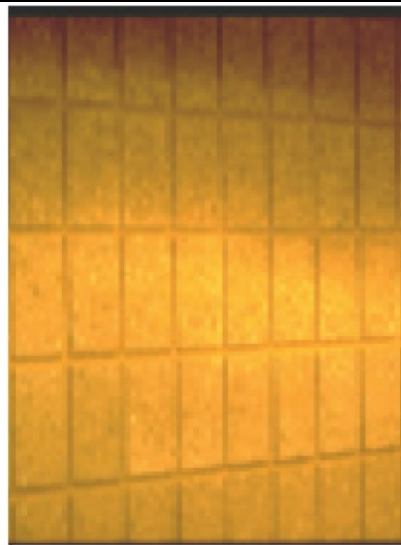
(c) Split and Ground Face

Figure 1—Examples of Architectural Concrete Masonry Units

Architectural Concrete Masonry Units

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(a) Scored and Ground Face



(b) Glazed



(c) Slump Block

Figure 2—Additional Examples of Architectural Concrete Masonry Units

Architectural Concrete Masonry Units

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Sand and Gravel Deposit

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Sand and Gravel Operation

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Specifying Concrete Masonry Units

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- Included in C 90
 - Compressive Strength
 - Absorption
 - Dimensional Tolerances
 - Density Definitions
 - Linear Drying Shrinkage



C 90

Standard Specification for
Loadbearing Concrete
Masonry Units

Specifying Concrete Masonry Units

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- **NOT** Included in C 90
 - Color
 - Texture
 - Density
 - Water Repellency
 - Fire Ratings
 - Thermal Properties
 - Sound Properties

Most architectural concrete masonry units are custom made. Work closely with producers to get exactly what you want.



C 90

Standard Specification for
Loadbearing Concrete
Masonry Units

TEK 1-1C



Specifying Concrete Masonry Units

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ASTM C 90 includes:

Permissible Variations in Dimensions

Standard Units.

Particular Feature Units.

Exposed Surfaces; Finish and Appearance Observational Conditions

When viewed from a distance of not less than 20 feet under diffused lighting.

Approved sample using not less than four units representing range of color and texture.

Color and texture need be specified.

Compliance allowances

Stucco Covering

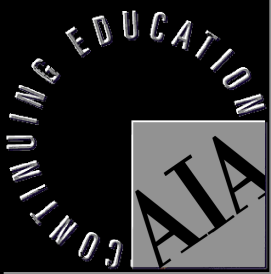
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Award-Winning Veneer

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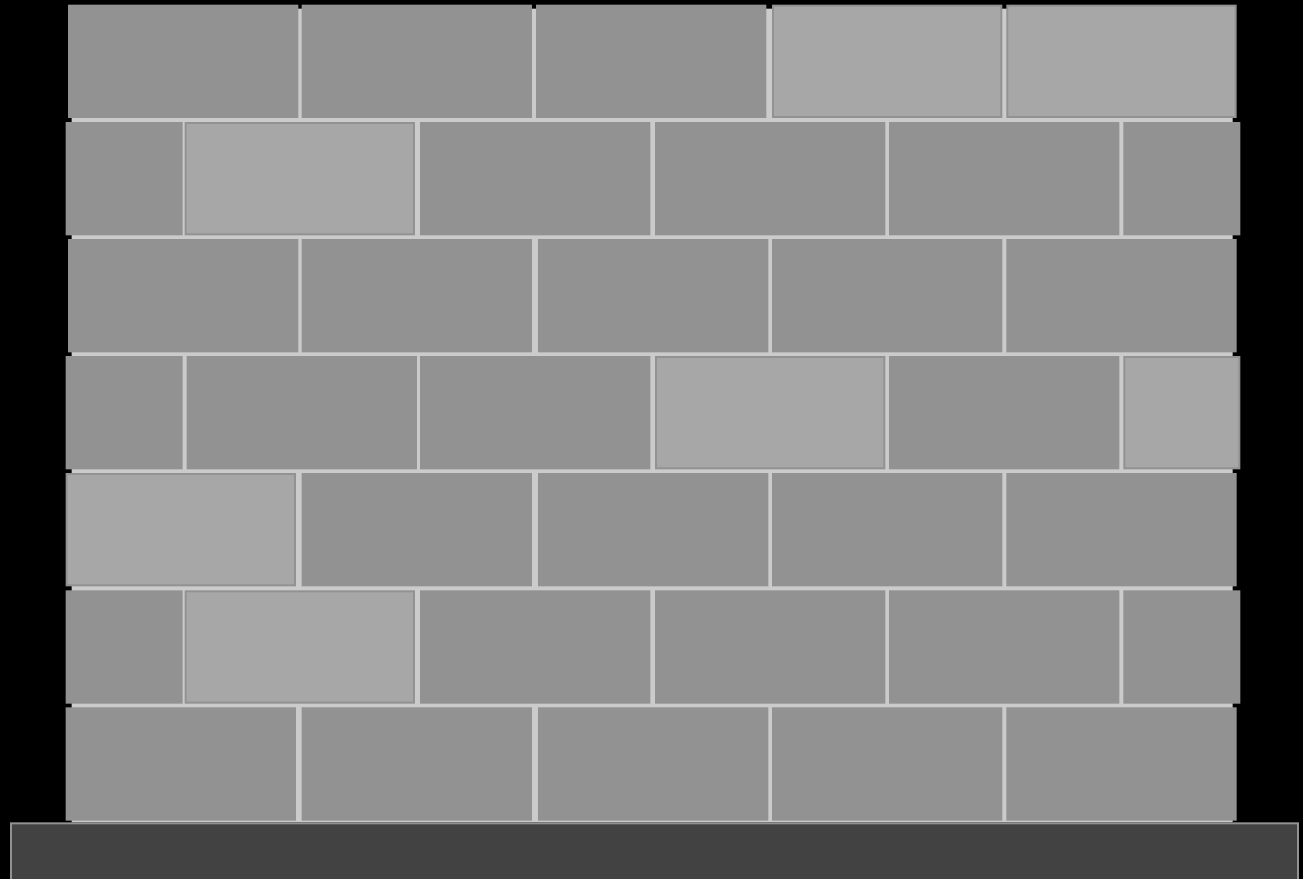


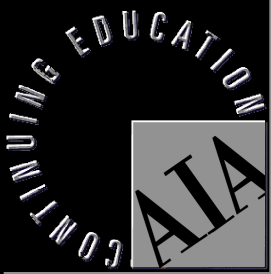


Specifying Concrete Masonry Construction Natural Color Variations of Gray Block

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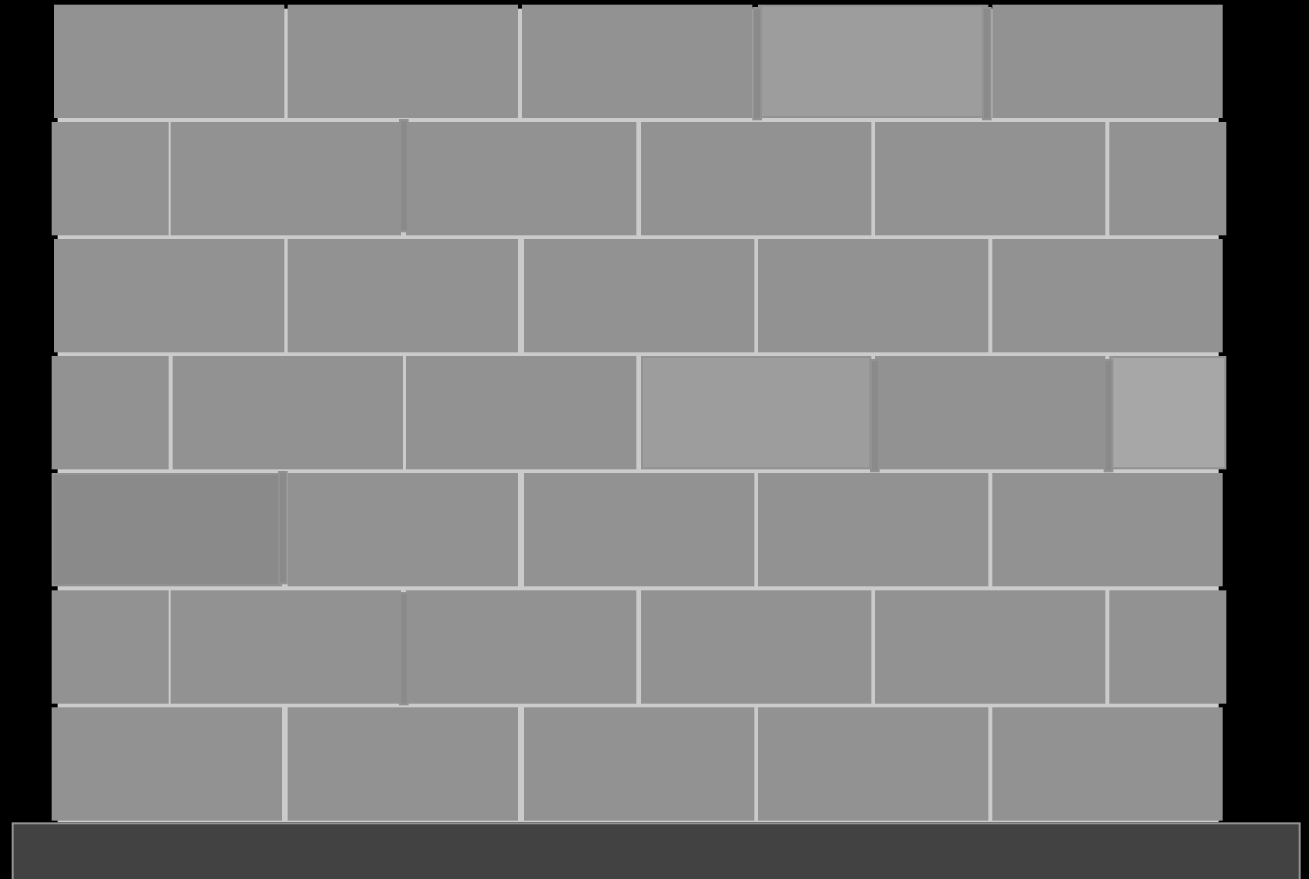


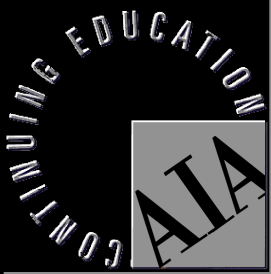


Specifying Concrete Masonry Construction

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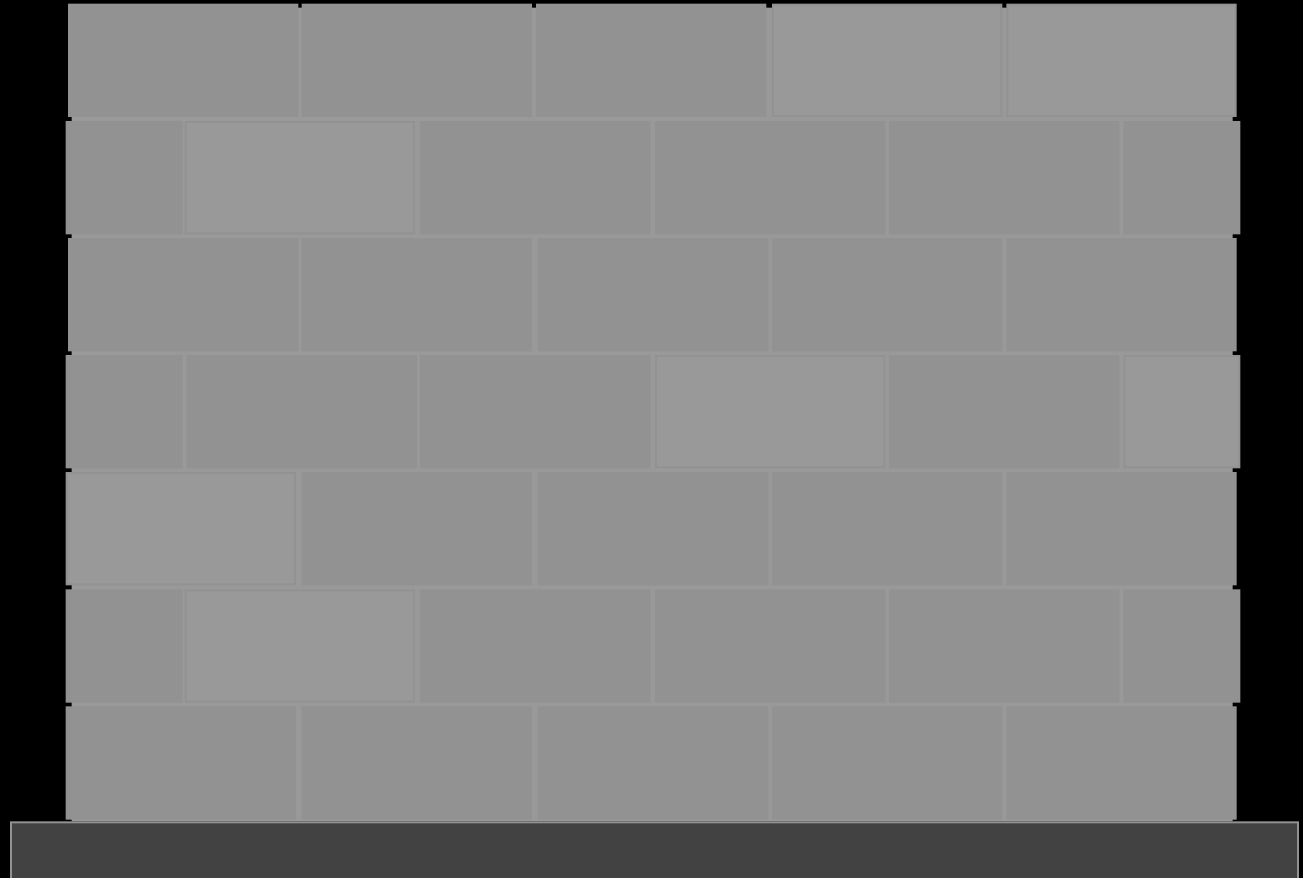




Specifying Concrete Masonry Construction

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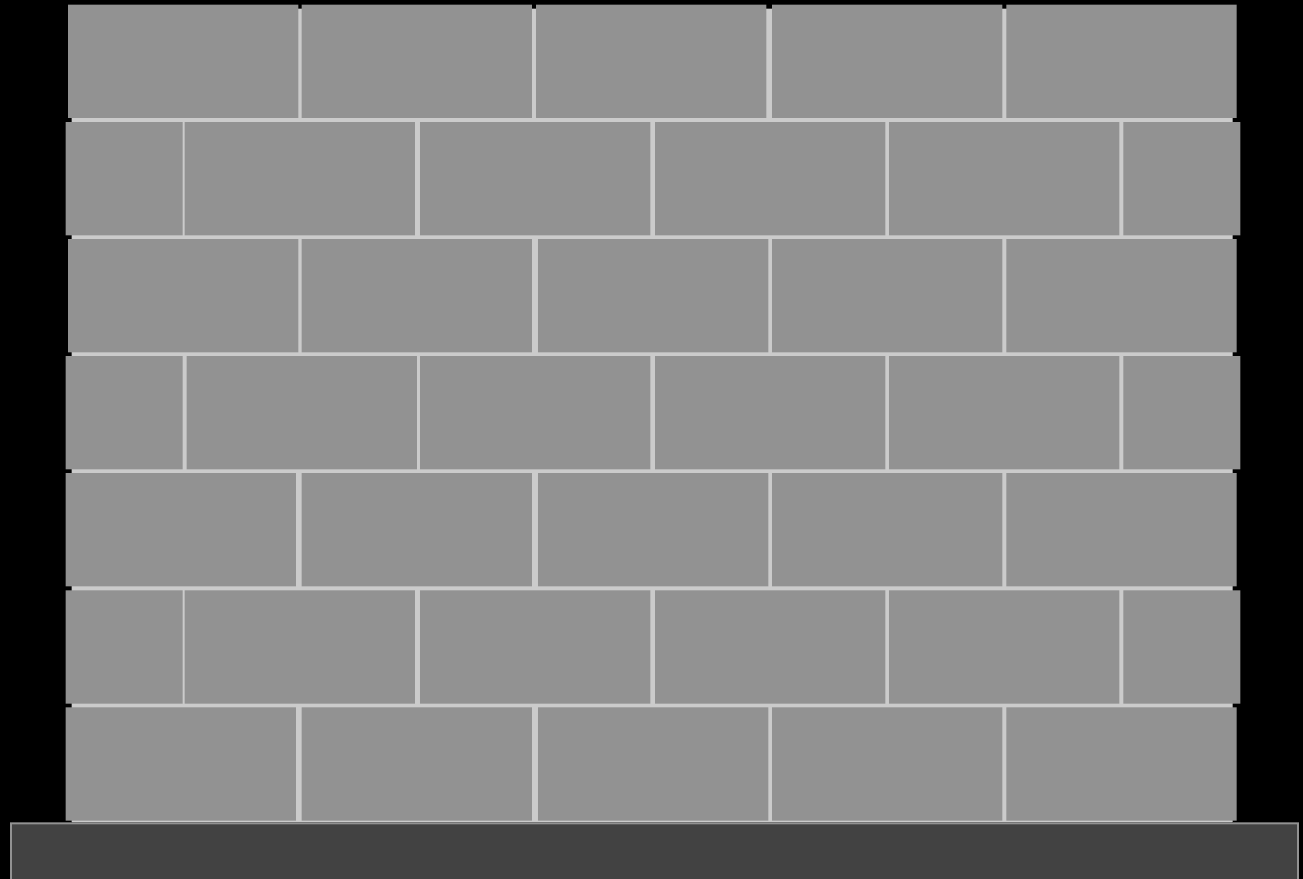




Specifying Concrete Masonry Construction

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Products & Workmanship

Tying it all Together

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- **The quality and compatibility of material components and care in installation are key to wall performance.**
- **The recommended specification for products and workmanship for masonry construction are covered in the applicable edition of Masonry Standards Joint Committee ACI 530.1/ ASCE 6/ TMS 602 (“MSJC”)**

Reported by the Masonry Standards Joint Committee

Building Code Requirements for Masonry Structures
(ACI 530-02/ASCE 5-02/TMS 402-02)

Specification for Masonry Structures
(ACI 530.1-02/ASCE 6-02/TMS 602-02)

Commentary on
Building Code Requirements for Masonry Structures
(ACI 530-02/ASCE 5-02/TMS 402-02)

Commentary on
Specification for Masonry Structures
(ACI 530.1-02/ASCE 6-02/TMS 602-02)





Tolerances of Concrete Masonry Construction

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MSJC tolerances are structurally-based yet affect aesthetics:

Dimension of Elements

Variations of Elements

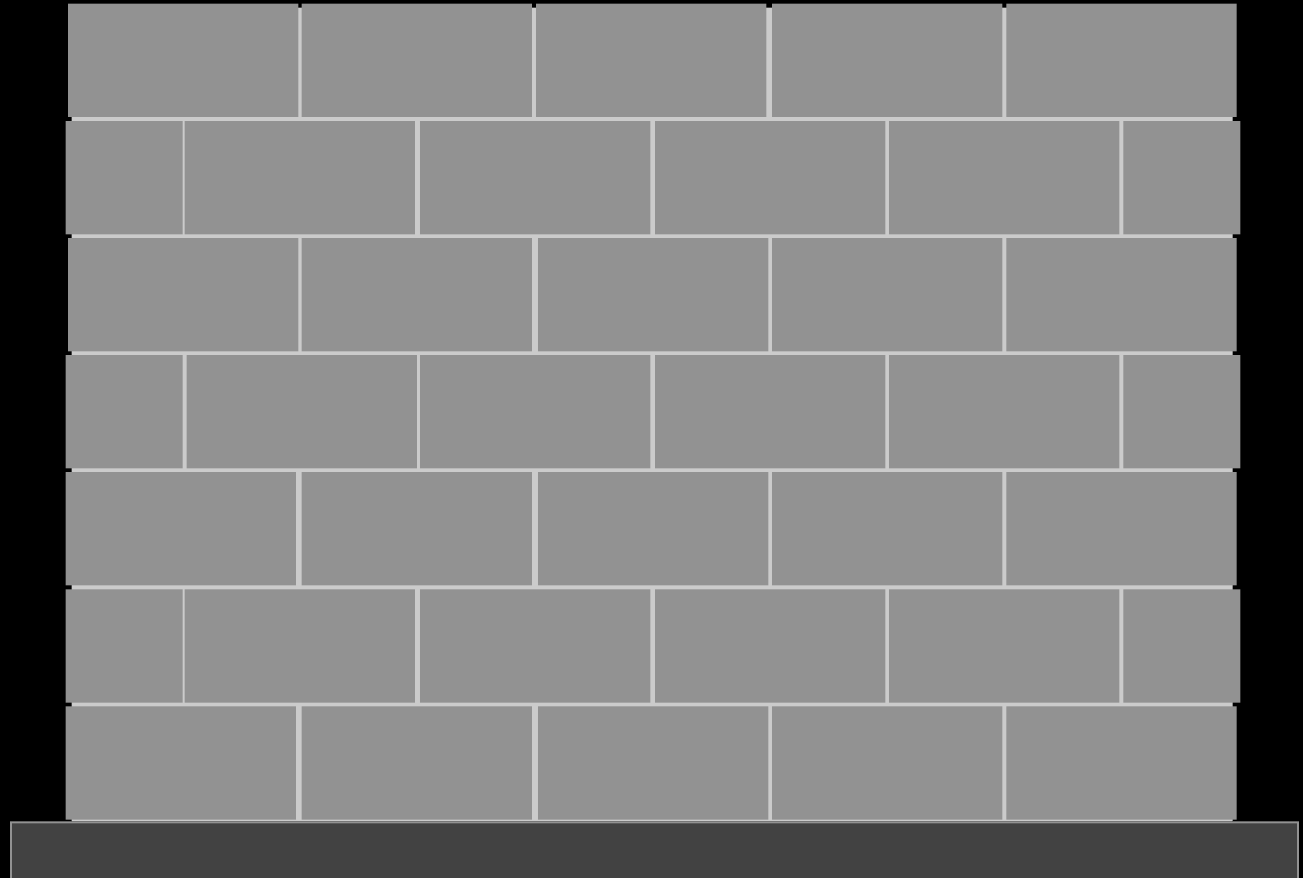
Locations of Elements



Tolerances of Concrete Masonry Construction

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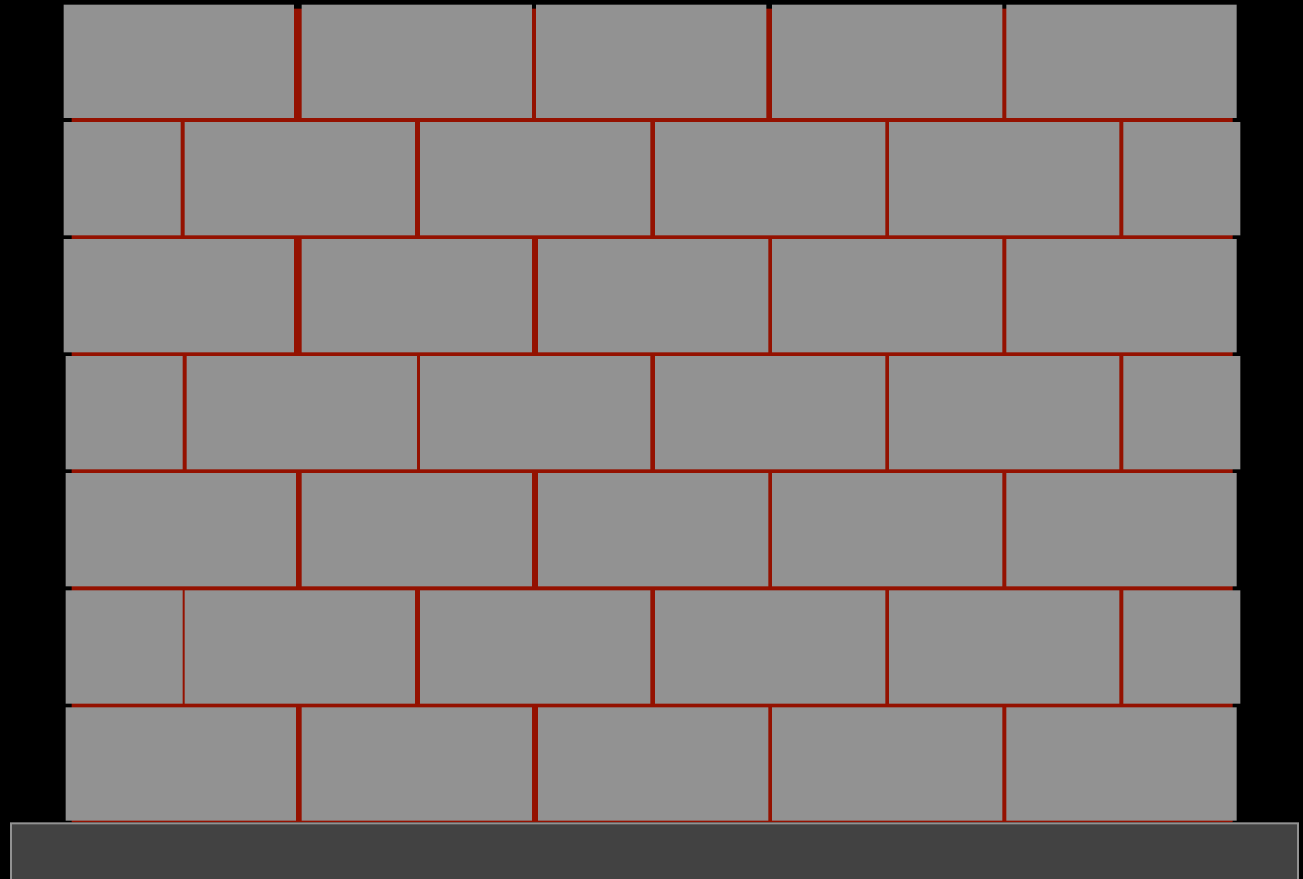


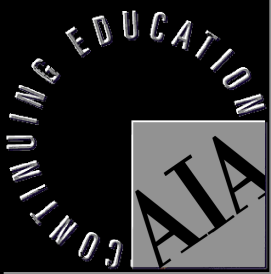


Tolerances of Concrete Masonry Construction

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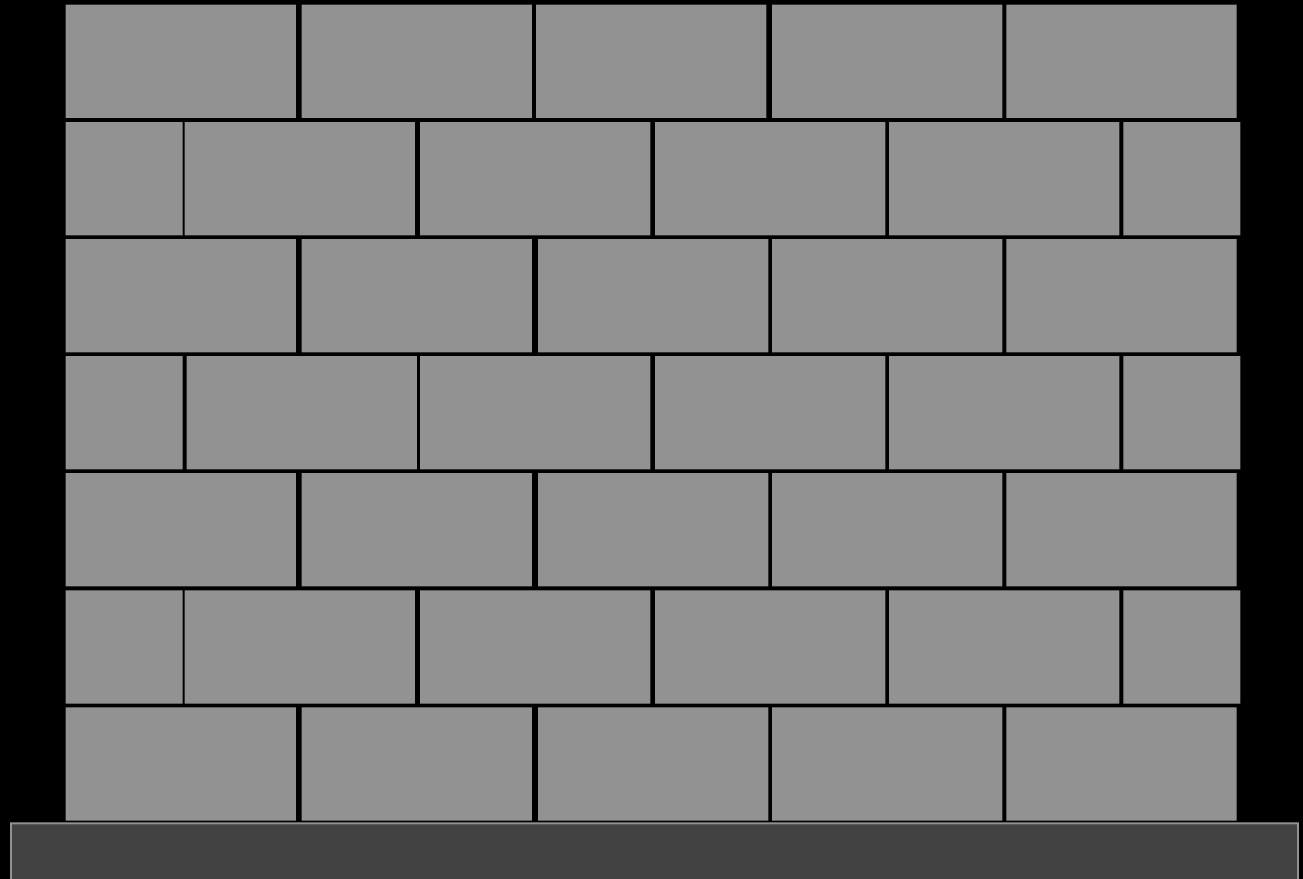




Tolerances of Concrete Masonry Construction

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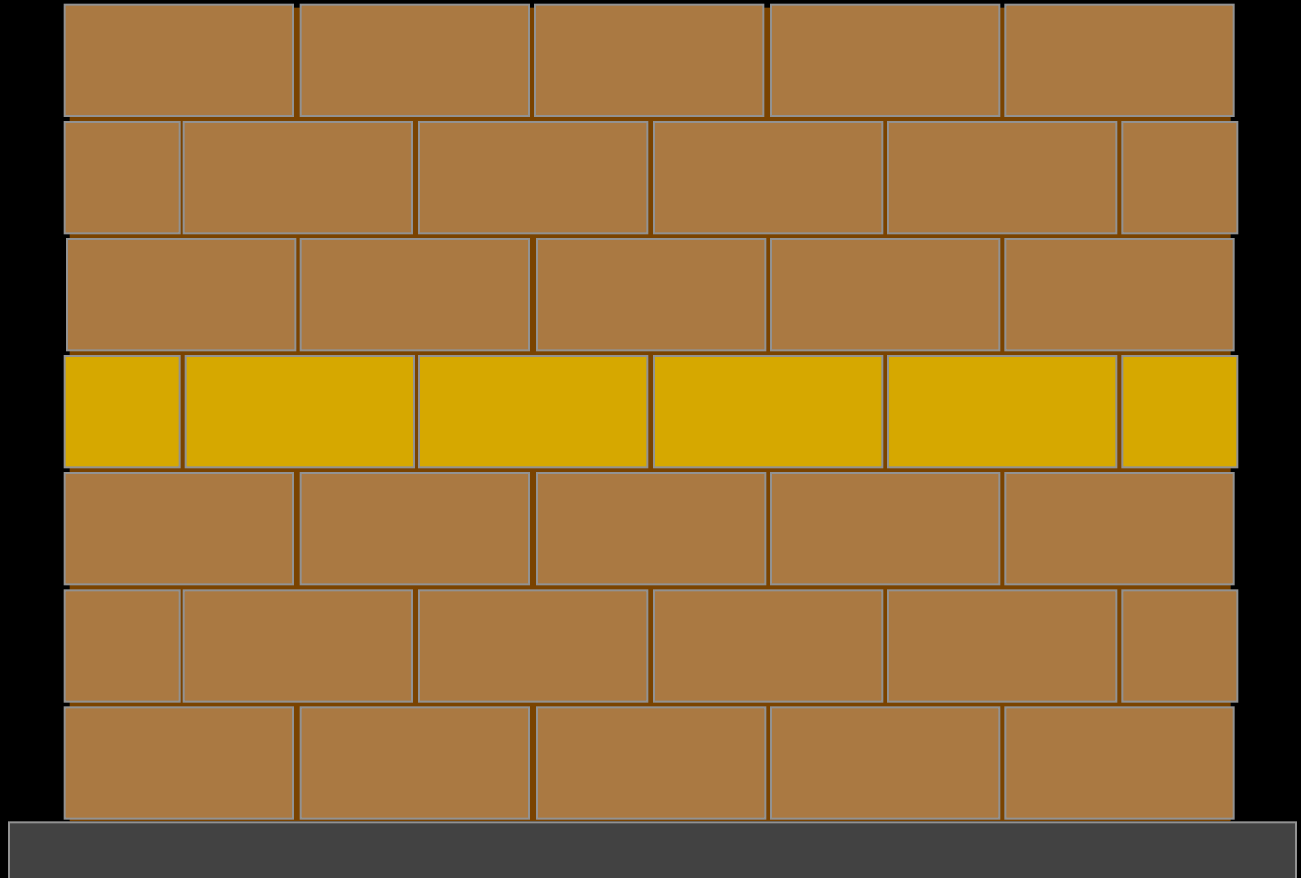




Specifying Concrete Masonry Construction

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Block Color Banding with Mortar Shading

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More Banding With Texture

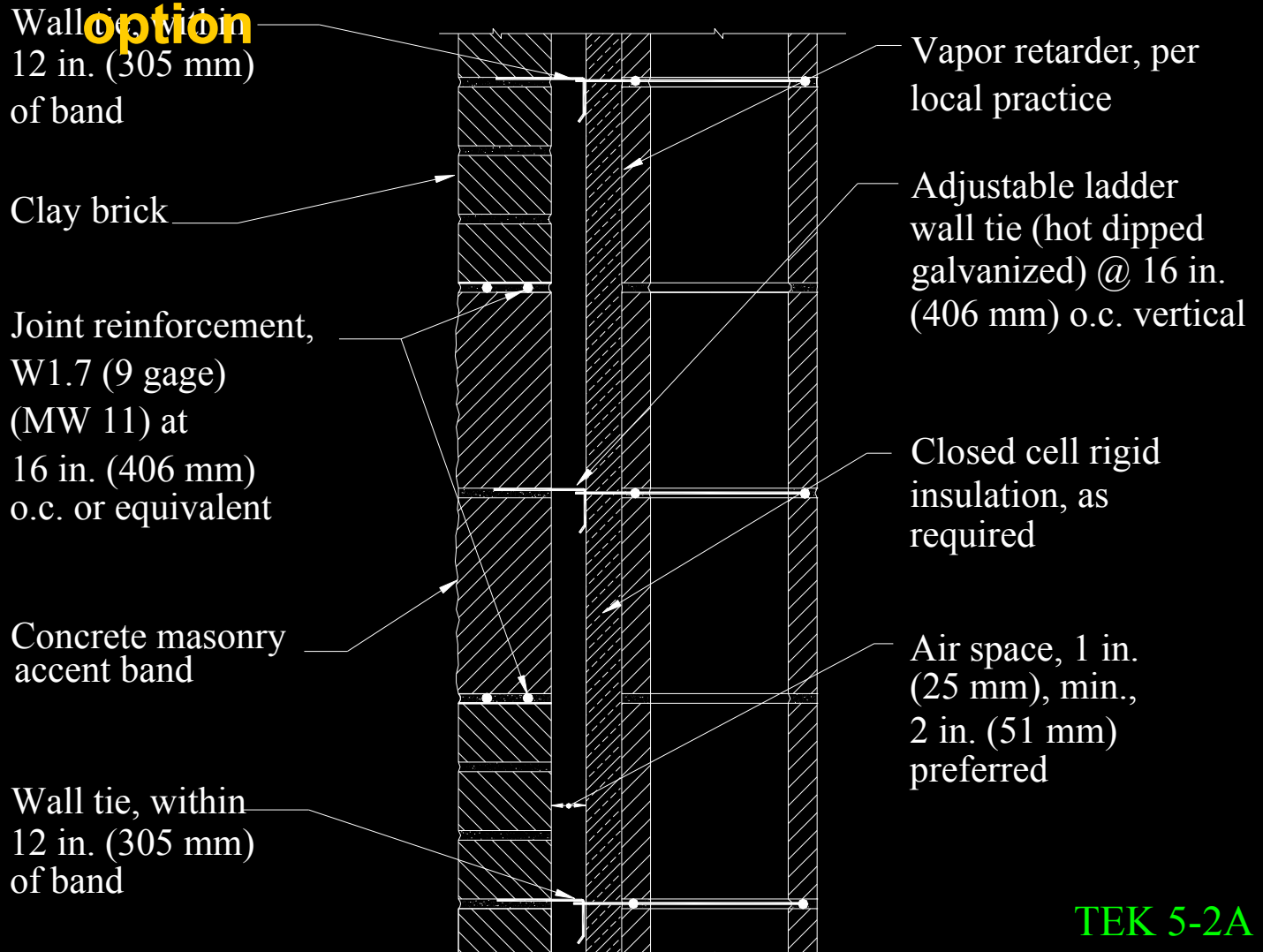
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CMU Band in Clay Brick Veneer

Joint reinforcement w/ no slip plane

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Construction of High Rise Concrete Masonry Buildings

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TEK 3-12



Low-Rise Construction

TEK 3-13

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Low-Rise Construction

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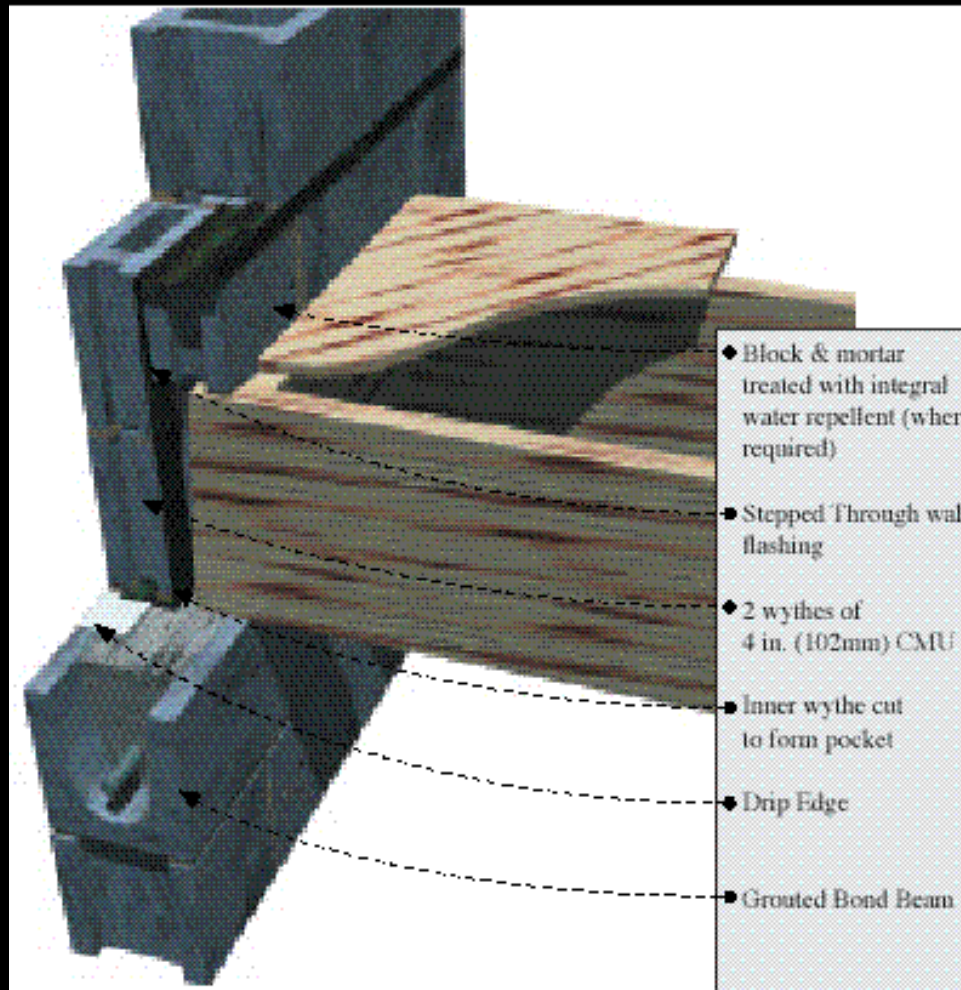


Figure 4—Beam Pocket Bearing Detail

Low-Rise Construction

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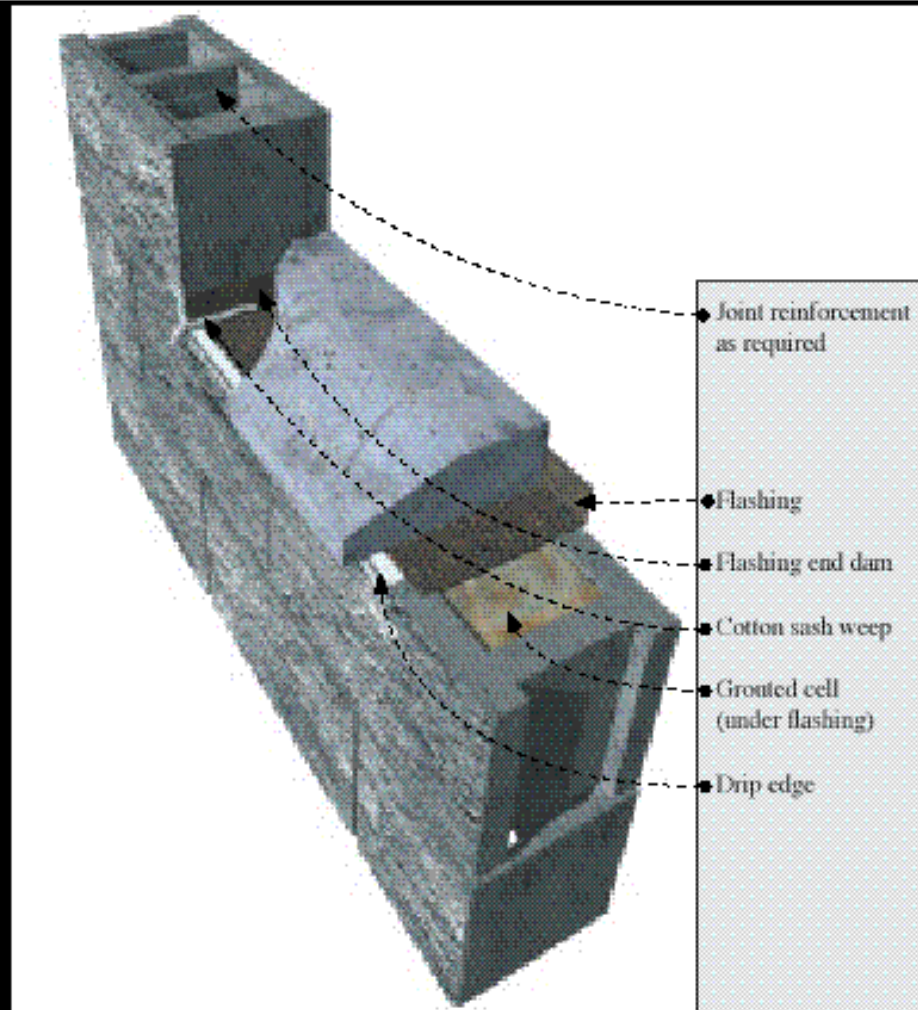
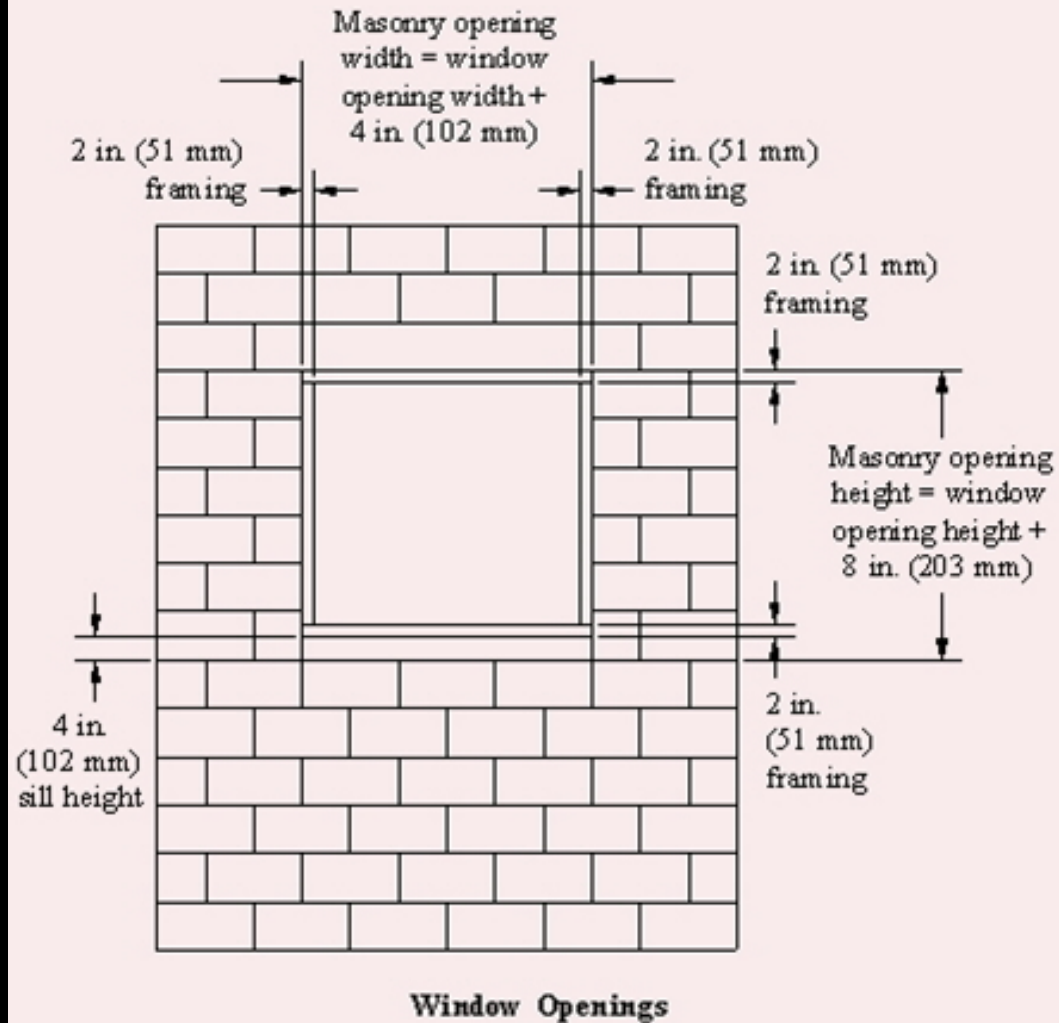


Figure 9—Window Sill Detail

Productivity and Modular Coordination

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Productivity and Modular Coordination

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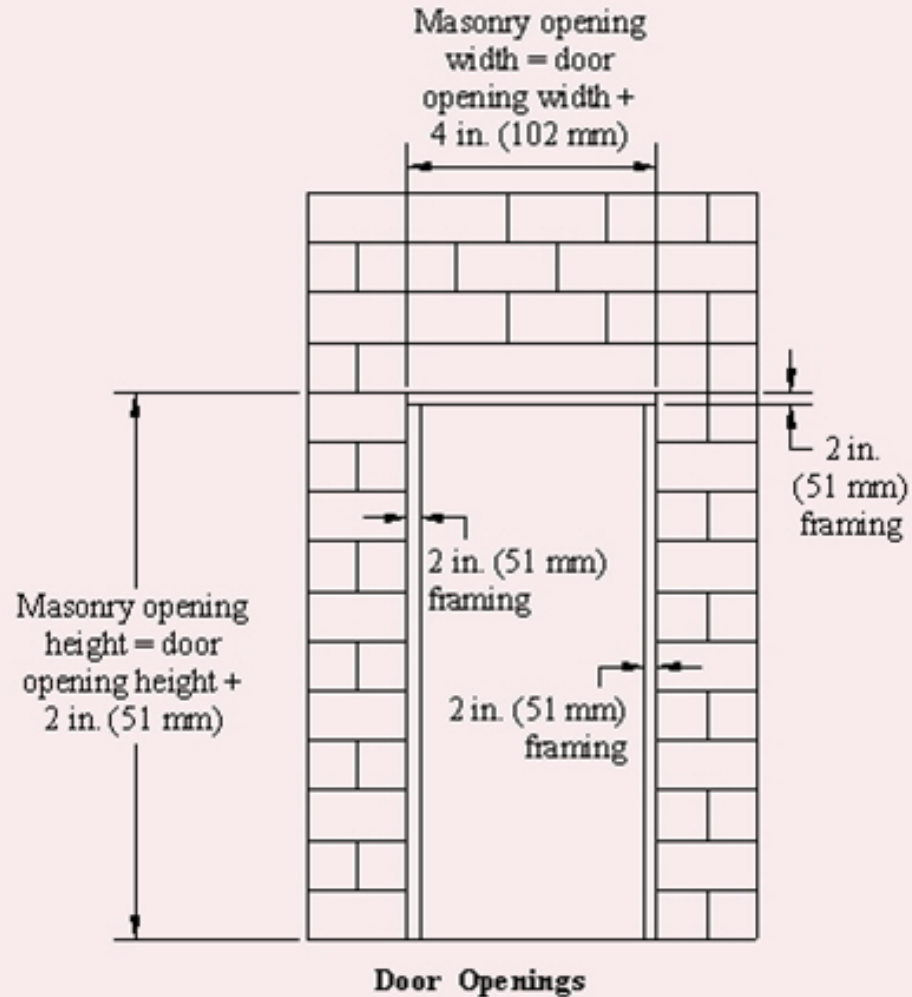


Figure 2—Modular Wall Openings

Integrating Concrete Masonry Walls with Metal Buildings

TEK 5-5A

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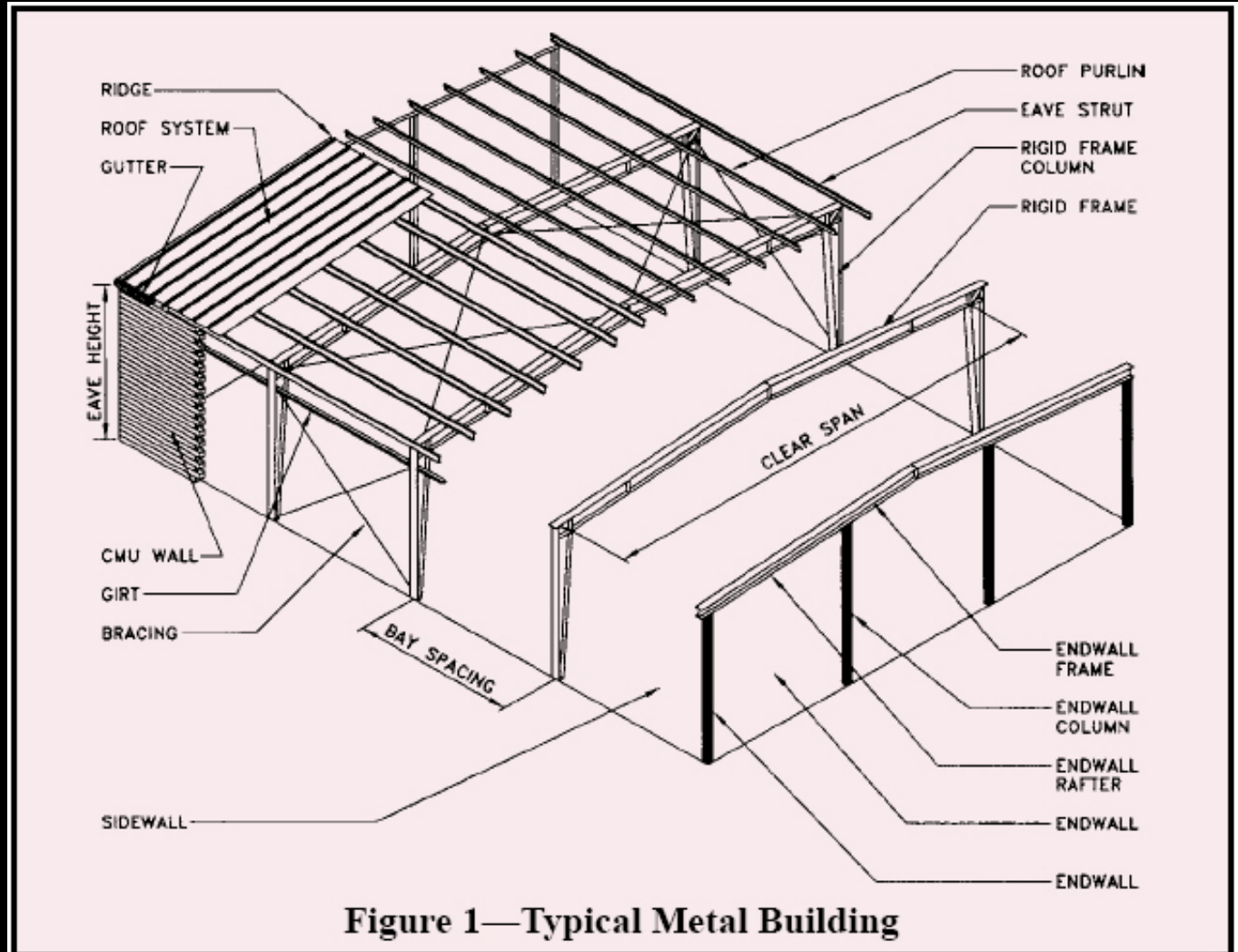


Figure 1—Typical Metal Building

Integrating Concrete Masonry Walls with Metal Buildings

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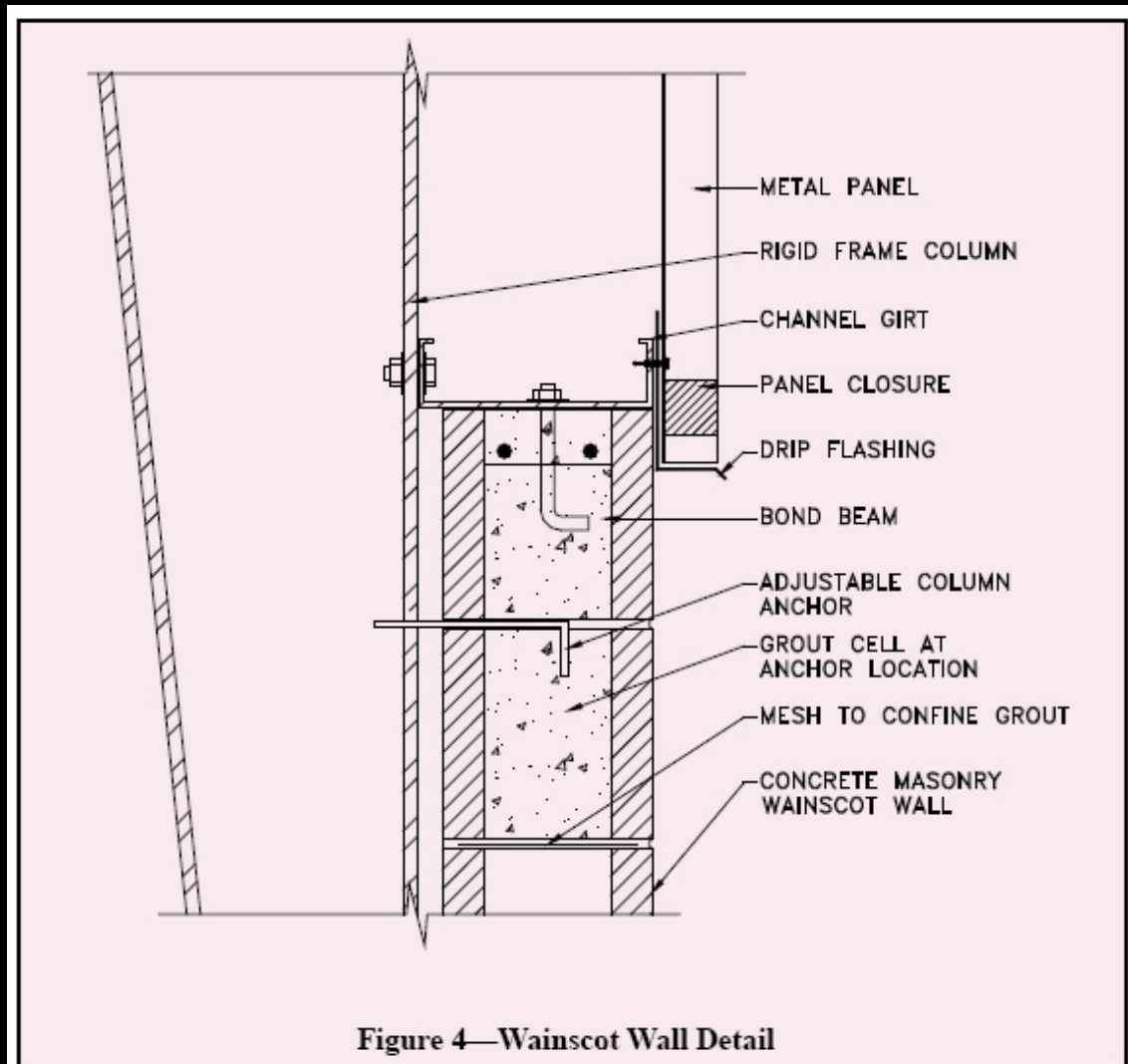
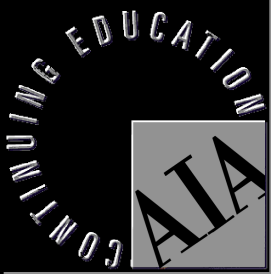


Figure 4—Wainscot Wall Detail



Maintenance of Concrete Masonry Walls

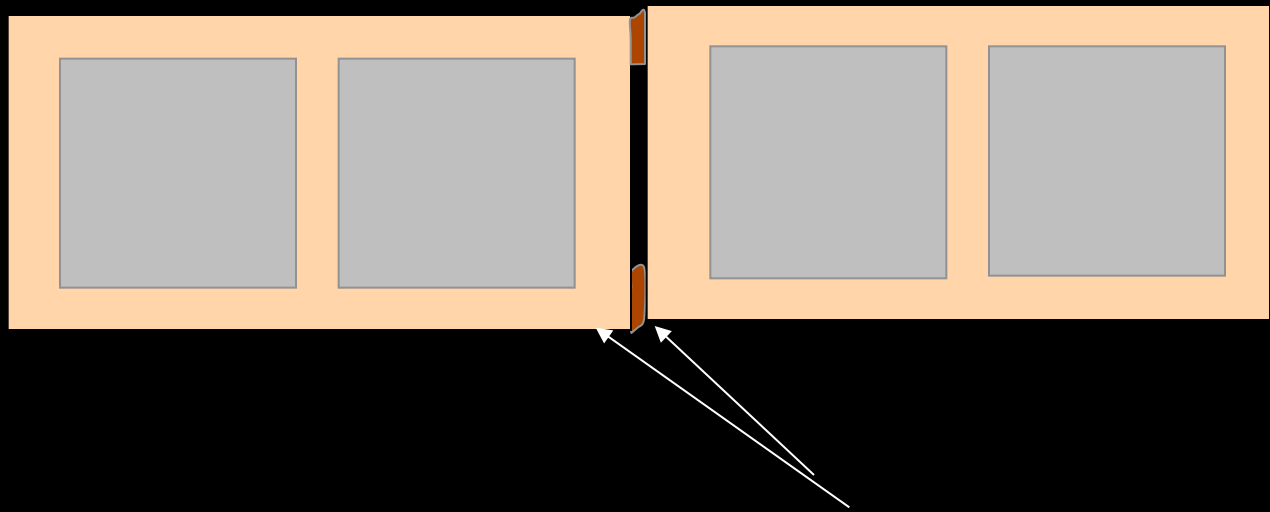
TEK 8-1A

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Table 2 – Estimated Life of Materials

Material	Estimated Life (Years)
Concrete Masonry Units	100+
Caulking	5-15
Coping/flushing	25+
Mortar	100+
Paint	5-10
Post-applied water repellent	5-10
Stucco on masonry	100+

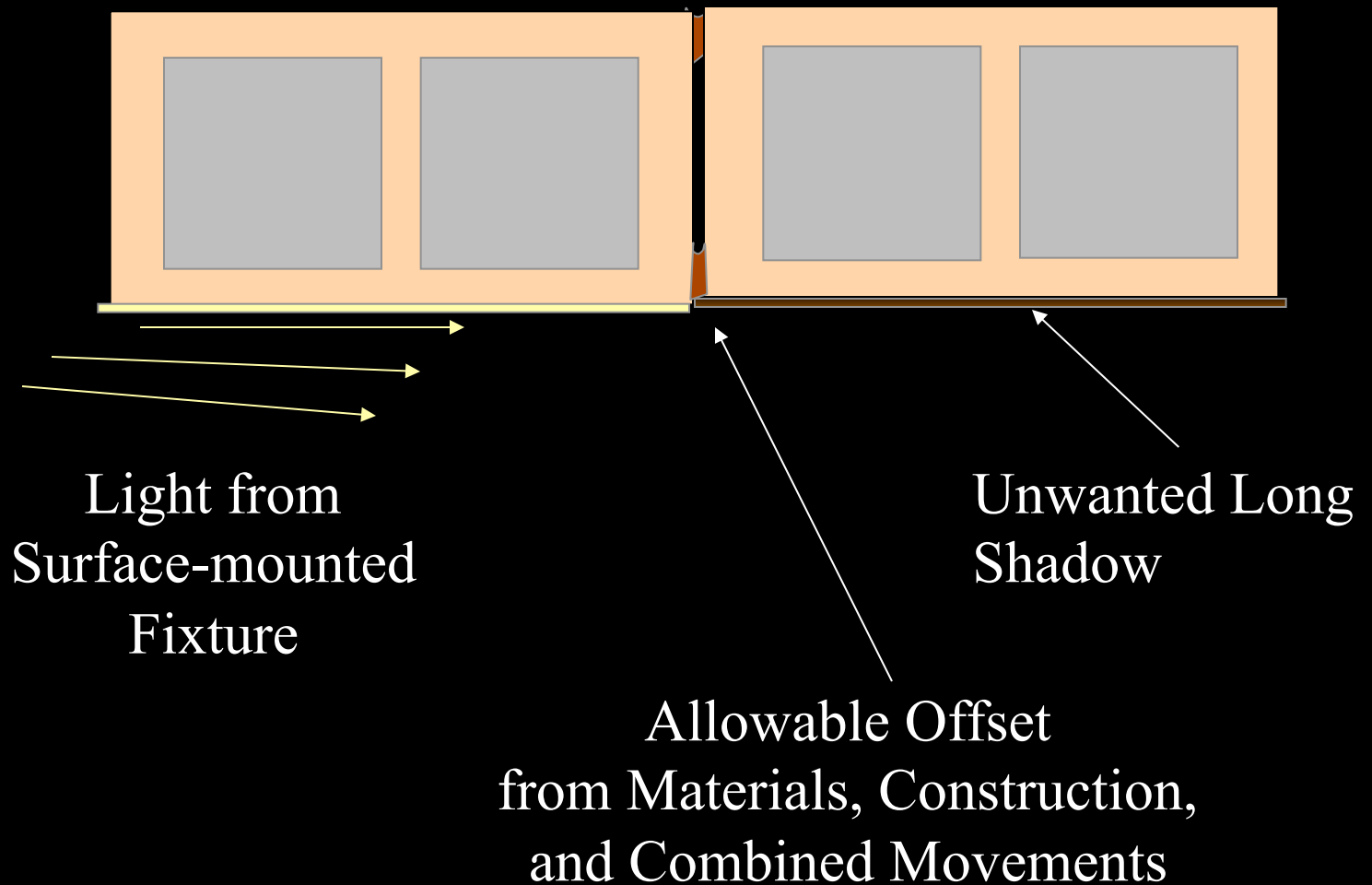
Determining Shadows



Allowable Tolerances and Offsets
from Materials, Construction,
and Combined Movements

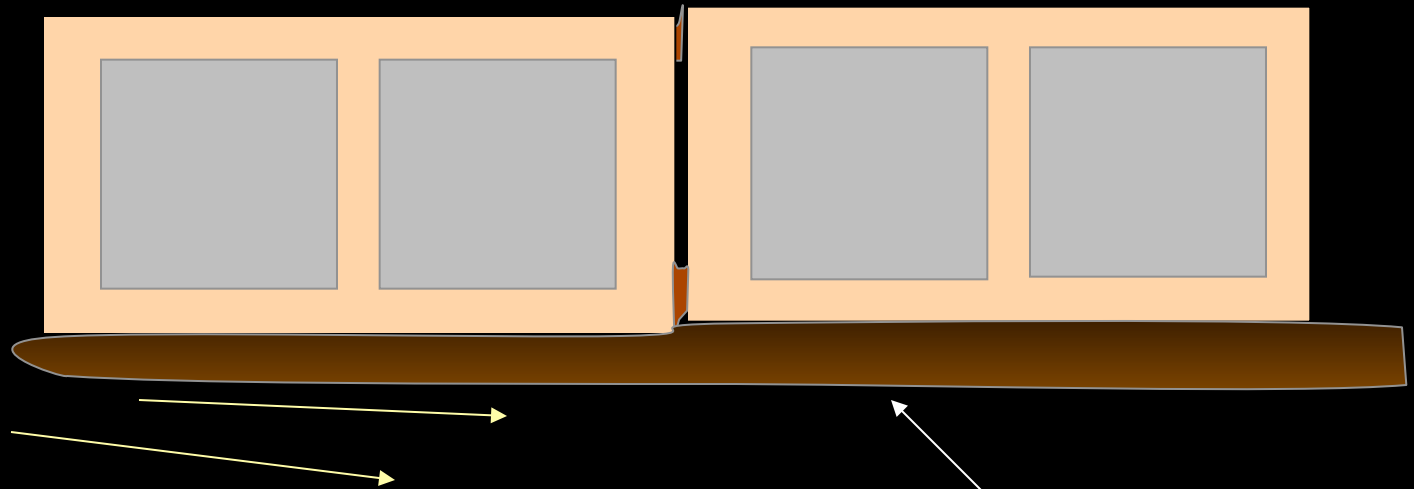
Calculating Shadows

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Enhancing Masonry: Controlling Shadows

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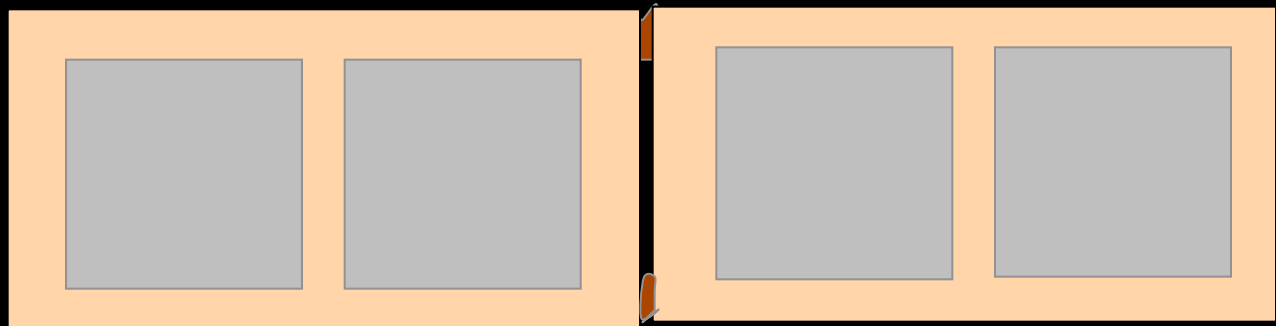


Offset, diffuse,
and/or Partially
Blocked Light
from Wall-mounted
Fixture

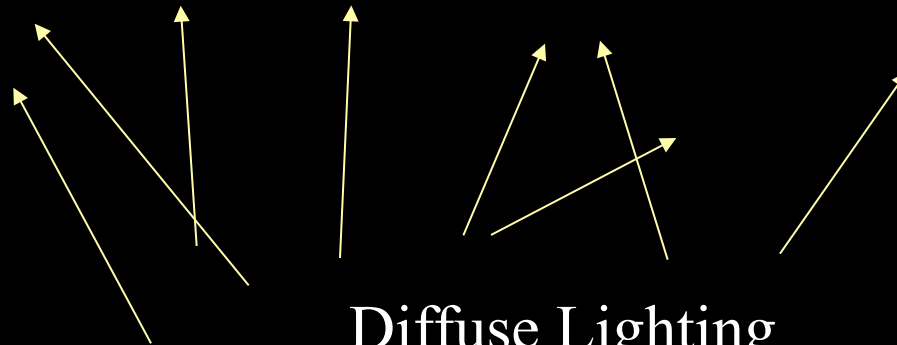
Low to subliminal light
= Darkened Area;
No Shadows

Enhancing Masonry: Controlling Shadows

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Place Shadows
into Joints



Diffuse Lighting



Summary

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- **Architecture can be enhanced using masonry**
 - **Proper design techniques.**
 - **In alliance with existing building codes and specifications.**
 - **To the satisfaction of the Client**
 - **Acknowledging masonry's time-honored characteristics**
 - **With an acceptable bottom line**



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References

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- **ASTM; ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959 USA**
- **International Building Codes and Commentary; ICC; International Code Council Inc., 4051 West Flossmoor Road, Country Club Hills, Ill, 60478-5795.**
- **MSJC; Masonry Standards Joint Committee; The Masonry Society, 3970 Broadway, Suite 201-D, Boulder, CO USA 80304-1135**
- **Steffy, Gary R., LC, IES, FIALD, Architectural Lighting Design, 2nd ed., John Wiley & Sons, 2002, N.Y., N.Y.**

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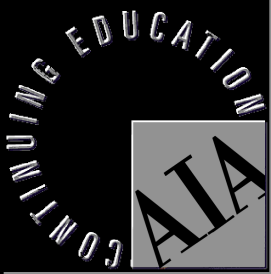
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13750 Sunrise Valley Drive
Herndon, VA 20171
703-713-1900

e-mail: ncma@ncma.org

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