NATIONAL ARCHITECTURAL PRACTICE COMMITTEE
SOCIETY OF AMERICAN MILITARY ENGINEERS

APC Quarterly Call – January 23, 2014
Agenda:

- Mission Statement and Organization Structural Review
- A Year of Reflection – What Have We Accomplished?
- Sub-committee Vice Chair and Service Liaison briefs.
- Local POC Report and Discussion
- Remarks by SAME President Gary Engle
- Presentation “Lessons Learned in the Masonry Field.” by Keith Lashway, the International Masonry Institute
- Q/A and Open Discussions
Mission Statement:

- Promote Architectural Practice within SAME.
- Broaden SAME’s exposure in the architectural community to attract more architects in SAME.
- Networking and mentoring.
Architectural Practice Committee

**SAME National Architectural Practice Committee**
- Chair – JJ Tang, AIA

**Advisory Board** - Urbahn Medal Group

**Service Branch Liaisons** -
- Army – Ed Gauvreau
- Navy – Kathleen Reid
- Air Force – Rick Sinkfield

**Collaboration with AIA**
- Vice Chair – Paula Loomis, FAIA

**Continuing Education**
- Vice Chair – Rad Delaney, AIA, FSAME

**Communications**
- Vice Chair – David Packard, RA, PMP

**SAME Conferences**
- Vice Chair – Homer Guy, AIA, FSAME
A year of Reflection – What Have we Accomplished?

1. Quarterly Committee Video Conference Calls:
   - January, April, July, October each meeting with a guest speaker
   - 1 AIA LU/HSW for each conference web meeting
   - About 50–60 participants, including three service branches.

2. Annual Architectural Practice Committee Meeting
   - Discussing, and establishing committee annual initiatives
   - Presentations by this year’s Urbahn Medal Phil Tobey and Gus Ardura on DoD healthcare topic, receiving 1.5 AIA LU/HSW
   - APC leadership social outing at Salk Institute and Dinner at Torrey Pines Golf Course
Architectural Practice Committee

APC leadership social outing at Salk Institute and Dinner at Torrey Pines Golf Course
Architectural Practice Committee

Connecting with team members at both national and local level

APC Leadership gathering in Alexandria, VA

Meeting with Pike’s Peak post POC
3. Establishing Service Branch Liaison Each for USACE, NAVFAC, and AFCEC:

- Advising the committee on initiatives benefiting service branch architects.
- Encouraging and supporting interactions among industry and service branches.
- Encouraging participation from all service branches in SAME architectural activities.
- Army Liaison: Ed Gauvreau, USACE HQ, Edmond.G.Gauvreau@usace.army.mil
- Navy Liaison: Kathleen Reid, NAVFAC Atlantic, kathleen.o.reid@navy.mil
- Air Force Liaison: Rick Sinkfield, Air Force Civil Engineer Center, ralph.sinkfield@us.af.mil
4. Establishing 22 POCs at Local SAME Post Level - Encouraging quality architectural programs in major SAME posts.

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<th>Post</th>
<th>Name</th>
<th>Email</th>
<th>Company</th>
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</table>
5. Collaborating with AIA

- Establishing allies organization with AIA the Public Architects Committee, a web link in both committees' webpage
- Working on a draft of MoA between AIA and SAME

6. SAME Continuing Education Course Webinars:

- Co-host with Sustainable Committee on The new High Performance and Sustainable Building Requirements UFC Webinar on June 24

7. Maintaining Architectural Practice Committee Webpage

- All presentations and newsletters are stored at committee webpage [http://www.same.org/apc](http://www.same.org/apc).
- The webpage is updated on monthly bases.
8. Quarterly Newsletter

- Two APC quarterly newsletters were issued — one in June, another in October.
- Great feedback: “Real Estate to product email blasts and newsletters fuel a constant in pouring of unread emails, but this one stopped me from clicking delete. Simply put...Awesome Newsletter!” Dana A. Pomeroy, SAME Member.

9. Architectural Sessions at SAME Regional Conference:

- Architectural session at 2013 SAME Great Lakes/Ohio Valley regional conferences in Davenport, Iowa on October 17.

10. Support to other committee and organizations:

- Boy’s Scout Architectural Merit Badge provided by Pike’s Peak post
- Architectural course for SAME Engineer camp at the Air Force Academy.
Recap of our committee 2013 major accomplishments:

- 1. Drawing SAME Architects together through quarterly calls, annual meetings, webpages, and educational programs.
- 2. SAME becoming more relevant organization to architects
- 3. Expanding SAME influence to architectural community

Committee focus for 2014:

- Stay the Course
- 2014 JETC Sessions – Service Branch Lead Architects’ Brief, Urbahn Medal Lecture/APC annual meeting.
- Two APC sponsored webinars – BIM in June and ATFP in October
- Special focus on collaborating with AIA – executing a MOA between AIA and SAME.
- Increasing Architectural Practice Committee visibility at local post or regional level.
Remarks by SAME President RADM Gary Engle
Guest Speakers –
Keith Lashway, Director of Technical Services
the International Masonry Institute
SAME Albany post president

“Lessons Learned in the Masonry Field.”

International Masonry Institute
www.imiweb.org
800-IMI-0988
lessons learned

International Masonry Institute
The International Masonry Institute is a Registered Provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.
Learning Objectives

Learn capabilities and properties of masonry materials

Understand basic strategies for moisture control

Realize why masonry walls move and how to accommodate that movement

Discover methods for Quality Control and how to improve your jobsites
brick properties
<table>
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<th>SPECIFIED DIM (in.)</th>
<th>MAX. PERMISSIBLE VARIATION FROM SPECIFIED DIMENSION, PLUS OR MINUS</th>
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<td></td>
<td>TYPE FBX</td>
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<td>3 AND UNDER</td>
<td>1/16</td>
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<tr>
<td>OVER 3 TO 4</td>
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<tr>
<td>OVER 4 TO 6</td>
<td>1/8</td>
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<tr>
<td>OVER 6 TO 8</td>
<td>5/32</td>
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<tr>
<td>OVER 8 TO 12</td>
<td>7/32</td>
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<tr>
<td>OVER 12 TO 16</td>
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**TOLERANCES ON DIMENSIONS**

**PROPERTIES**
- Modularity
- Moisture
- Movement
- Structural
- Troubleshooting
- Workmanship

**ASTM C 216 facing brick**
ASTM C 216 facing brick
## Tolerances on Distortion

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<th>Specified Dim (in.)</th>
<th>Max. Permissible Distortion (in.)</th>
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<tr>
<td>8 AND UNDER</td>
<td>1/16</td>
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<tr>
<td>OVER 8 TO 12</td>
<td>3/32</td>
</tr>
<tr>
<td>OVER 12 TO 16</td>
<td>1/8</td>
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**Properties**

- Modular
- Moisture
- Movement
- Structural
- Troubleshooting
- Workmanship

**ASTM C 216 facing brick**
brick properties
MAXIMUM PERMISSIBLE EXTENT OF CHIPPAGE FROM THE EDGES AND CORNERS OF FINISHED FACE OR FACES INTO THE SURFACE

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<tr>
<th>TYPE</th>
<th>CHIPPAGE (in.) IN FROM</th>
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<tr>
<td></td>
<td>EDGE</td>
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<tr>
<td>TYPE FBX</td>
<td>1/8</td>
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<tr>
<td>TYPE FBS (SMOOTH)</td>
<td>1/4</td>
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<tr>
<td>TYPE FBS (ROUGH)</td>
<td>5/16</td>
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<tr>
<td>TYPE FBA</td>
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ASTM C 216 facing brick
initial rate of absorption

- Recommendation 5-25 g/min/30 in²

- *Not a requirement in ASTM or MSJC*

- Consider high IRA brick for cold weather construction

- Consider low IRA brick for hot weather construction
masonry mortars

• ASTM C 270
• Mortar Options:
  – Portland Cement and Lime
  – Masonry Cement
  – Mortar Cement
• Mortar Types: M, S, N, and O
• Mortar Quality Control
### PROPORTIONS BY VOLUME

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<th>MORTAR TYPE</th>
<th>PORTLAND CEMENT OR BLENDED CEMENT</th>
<th>MORTAR CEMENT</th>
<th>MASONRY CEMENT</th>
<th>HYDRATED LIME OR LIME PUTTY</th>
<th>AGGREGATE RATIO (MEASURED IN DAMP, LOOSE CONDITIONS)</th>
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<td></td>
<td>M S N</td>
<td>M S N</td>
<td></td>
<td>¼</td>
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<td></td>
<td>1</td>
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<td>-- -- --</td>
<td>¼</td>
<td>OVER ¼ TO ½</td>
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<td></td>
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<td>-- -- --</td>
<td>-- -- --</td>
<td>OVER ½ TO 1¼</td>
<td>OVER ½ TO 1¼</td>
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<tr>
<td></td>
<td>1</td>
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<td>-- -- --</td>
<td>OVER 1¼ TO 2½</td>
<td>OVER 1¼ TO 2½</td>
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<tr>
<td>MORTAR CEMENT</td>
<td></td>
<td>M S N</td>
<td>M S N</td>
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<td>NOT LESS THAN 2¼ AND NOT MORE THAN 3 TIMES THE SUM OF SEPARATE VOLUMES OF LIME, IF USED, AND CEMENT</td>
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<td>--</td>
<td>1 -- --</td>
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<tr>
<td>MASONRY CEMENT</td>
<td></td>
<td>M S N</td>
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### PROPERTIES

- MODULARITY
- MOISTURE
- MOVEMENT
- STRUCTURAL
- TROUBLESHOOTING
- WORKMANKSHIP

**ASTM C 270 Table 1 Mortar Properties**
mixing mortar
modularity
modularity

Goals

• Dimension structures/ elements to standard lengths/ heights to accommodate modular sized masonry units

• Standardize and simplify design and construction

• Decrease construction cost and duration
modularity

Unit + standard mortar joint = 8 inches
horizontal layout

- Avoid < half sized units
- Especially jambs and corners
- Door is located for full and half units at jambs
- Frames are stock items… no on-site cutting
- Looks symmetrical
non-modular design

- Aesthetically unpleasing
- Unnecessary cuts
- Costly to mason contractor
Only full and half units at corners and jambs

Full units are hand cut with the end or head turned out

Efficient and economical
Window lintel should be bearing on full brick

This is most likely an installation error, coursed incorrectly
modularity
How is the masonry over door head supported/reinforced?
modular design

1. Top of door frame even coursing with CMU
2. Full height block above door
3. Easily adaptable options for mason to reinforce

good practice - vertical
non-modular example

- Dormitory
- 4 floors, 40 suites per floor
- 200’-4” x 50’-0”
- Windows 4’-0” high x 3’-0” wide located 4’-2” off corners every 10’-0”
40 suites per floor x 4 floors = 160 windows
2 jambs per window = 320 jambs
18 brick courses in 4’-0” high window
1 cut per course per jamb
320 jambs x 18 cuts = 5,760 total brick cuts, not including backup block
Solution:

- Position first window at modular dimension off corner with subsequent windows at modular intervals
In Masonry Construction

- Dimensional stability of units
- Uniform mortar joint width
- Plumb points
- Head joint alignment is consequential
cavity wall
aka
[drainage wall]

- Air space
- Flashing
- Weep holes
air space

2” recommended
1” min. for veneers, code
mortar bridging

No mortar bridging across the cavity!
Rising Damp

Keep top of foundation above grade

Don’t bury the weeps!
flashing
problems to avoid

Lap all seams …and adequately seal!
flashing splices

6” laps with sealed seams is best practice!
problems to avoid

Avoid sharp corners  Use rounded corners
problems to avoid

Avoid using PVC

Not stable!
flashing failure
flashing failure
flashing failure
DETAIL FEATURES
• SLOTTED HOLES AT CLEAT ALLOW FOR BRICK EXPANSION

metal coping detail
field-applied corner boot
prefabricated corners
flashing stops short

end dam required!
proper end dams
end dam details

**Figure 2**
FIELD FORMED FLASHING END DAM

**Figure 3**
PREFABRICATED FLASHING END DAM

- **Insert flashing under building wrap a minimum of 6 inches.**
- **Extend end of the flashing beyond the opening and turn up to form an end dam.**
- **Extend flashing flush or beyond the face of the masonry unless specified otherwise.**

- **Cut building wrap and seal to accommodate prefabricated end.**
- **Extend the flashing beyond the opening and install prefabricated end dam. If flashing is not self-adhering, set end dam in bed of mastic.**

**4” to 8”**
weep vent types

- Plastic sleeve
- Head joint vent
- Fiber mesh vent
- Sash cord
- Plastic tube
- Cell vent
open head joints

• Better moisture relief & ventilation
• May attract insects
• May mistakenly be caulked
weep vents
weep vents
movement control
Code 1.2.2: Show all Code required items on the project drawings, including:

1.2.2 (h) Provisions for dimensional changes resulting from elastic deformation, creep, shrinkage, temperature and moisture
movement joint locations

- change in thickness
- corners
- pilasters
- change in wall height
- straight runs
- intersecting walls
- openings

PROPERTIES
MODULARITY
MOISTURE
MOVEMENT
STRUCTURAL
TROUBLESHOOTING
WORKMANSHIP
corners
No Expansion Joint at Corner
Movement Control – Sealant Joint Color
detailing
wall ties

Match to application

- Commercial
- Residential
wall Ties
Wall Ties

“Masonry veneer shall be anchored to the supporting wall with corrosion-resistant metal ties”
Masonry veneer anchored to wood backing  
“Veneer shall be attached with any anchor permitted in Section 6.2.2.5 (i.e. corrugated sheet metal, sheet metal, wire, or adj.)”  

Masonry veneer anchored to steel backing  
“Attach veneer with adjustable anchors”  

Masonry veneer anchored to masonry or concrete  
“Attach veneer to masonry backing with wire anchors, adjustable anchors, or joint reinforcement. Attach veneer to concrete backing with adjustable anchors”
wall ties

Which Type?

Veneer anchored to cold-formed steel backings (steel studs)

Adjustable metal strand wire ties

International Residential Code 2000, Section R703.7.4 Anchorage
Corrugated sheet metal wall ties are only permitted, within certain limitations, for wood stud backup.

International Residential Code 2000, Section R703.7.4 Anchorage

ACI 530-02/ASCE 5-02/TMS 402-02, Chapter 6 Veneer, Section 6.2.2.6.3
commercial
Strength of masonry simplifies construction

Balances:

– Manufacturing
– Transportation
– Production
– Embodied energy
– Recyclable potential
Reinforcing masonry improves masonry wall performance:

• Improved Resistance to Lateral Loads
  – Wind
  – Seismic Events

• Helps Withstand Various Axial Loadings

• Provides Redundancy & Robustness
  – Blast Resistance
  – Progressive Collapse response

• Walls Can Be Built Taller & Thinner

• Solid grouting improves fire resistance
self-consolidating grout
Daylighting and Views

- Loadbearing Construction
- Brick/CMU

The Flynn Center, MD
efflorescence
other stains
NOTE:
DEEP RECESSES MAY RESULT IN MOISTURE PENETRATION

CMU BACKUP W/ GROUT & REINFORCING
CORED BRICK

2" RIGID INSULATION
AIR/WATER/VAPOR BARRIER AS REQ'D

100% SOLID BRICK

3" D. 100% SOLID SPECIAL UNITS
100% SOLID BRICK
HORIZONTAL JOINT REINFORCEMENT W/ INTEGRAL WALL TIES

CORED BRICK

ISOMETRIC

Cavity Wall Recessed Units
recessed course
architectural effect
sills and ledges

Slope rowlocks at least 15 degrees
HORIZONTAL JOINT REINFORCEMENT W/ INTEGRAL WALL TIES

THRU-WALL FLASHING W/ METAL DRIP EDGE SET IN MASTIC OR SEALANT

RIGID INSUL.

2” AIR SPACE RECOMMENDED; 1” MIN. REQ’D FOR DRAINAGE WALLS

WEEP/VENT

ADJUSTABLE SHELF ANGLE

LIPPED BRICK, OPTIONAL

SEALANT & BACKER ROD

COMPRESSIBLE FILLER, OPTIONAL

shelf angle detail
quality control
clean cavities
Mortar droppings

clean cavity

cavities
workmanship tolerances
**JOINT**

Bed Joint  
Head Joint  
Collar Joint

**ALLOWABLE TOLERANCE**

+/- 1/8”

-1/4”, +3/8”

-1/4”, +3/8”

**mortar joint tolerances**

**ACI 530 Code**
Allowable Variations

H = WALL HEIGHT
D = ALLOWABLE VARIATION FROM PLUMB AT ANY LOCATION

WHEN \( H < 10'-0" \)
\( D < 1/4" \)

WHEN \( H < 20'-0" \)
\( D < 3/8" \)

WHEN \( H > 20'-0" \)
\( D < 1/2" \)

masonry out-of-plumb
Allowable Variations

L = LENGTH OF WALL

d = ALLOWABLE VARIATION FROM PLAN AT ANY GIVEN POINT

WHEN L ≤ 10'-0"
    d ≤ 1/4"

WHEN L ≤ 20'-0"
    d ≤ 3/8"

WHEN L ≥ 20'-0"
    d ≤ 1/2"

masonry out-of-plan

PROPERTIES MODULARITY MOISTURE MOVEMENT STRUCTURAL TROUBLESHOOTING WORKMANSHIP
masonry out-of-level

Allowable Variations
samples panels
Architectural Practice Committee

- Q/A
- Next APC video conference call in April, 2014
- Please email your AIA number to Rad Delaney raddelaney@gmail.com for your 1 AIA CEU.
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david.a.packard@usace.army.mil

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J. M. Waller Associates, Inc.
(210) 822-8006
Homer.Guy@JMWALLER.COM

Architectural Practice Committee webpage:
http://www.same.org/apc