ASTM International Workshop for Local Architects, Engineers and Contractors

Hyatt Regency Riverfront – Jacksonville, FL

Monday, December 9, 2013
Workshop is presented by Four ASTM Committees:

- C09 on Concrete and Concrete Aggregates
- C12 on Mortars and Grouts for Unit Masonry
- C15 on Manufactured Masonry Units
- D08 on Roofing and Waterproofing
Purpose of Workshop

- To present information on how ASTM Standards are developed and on how architects, engineers, and contractors can participate in the development of ASTM standards in their industry.

- To discuss new and developing information in ASTM standards that might be of interest to architects, engineers, and contractors in design and construction.
Program Outline

- Committee C15: Mark McGinley
- Committee C12: John Wathne
- Committee C09: Jay Shilstone/Jeff O’Leary
- Committee D08: Jason Aspin
- ASTM Standard Development
- Wrap up
Committee C15 on Manufactured Masonry Units

W. Mark McGinley

- Professor & Endowed Chair for Infrastructure Research, University of Louisville
- First Vice-Chairman, Committees C12 and C15
- Subcommittee Chair for C15.07/C12.07 on Laboratory Accreditation
Committee C15 on Manufactured Masonry Units

C 15 Scope:

- Standards, relating to the manufacture of manufactured masonry units of inorganic materials, including but not limited to fired clay and shale, concrete, sand-lime, and coatings for such units.

- Standards on the use of these units in site-built and prefabricated masonry elements.
Committee C15 on Manufactured Masonry Units

Hot Topics in C 15

- New Subcommittee on Alternative Masonry Materials
- Changes in Specifications for Concrete Masonry Units C90
  - Web areas
  - Compression strengths
C 15.12 Alternative Masonry Materials and Related Units

Was a task group in the C 15.90 Executive subcommittee in response to a request for new standards for “carpet” brick and companies producing units that were compared to property characteristics of existing unit standards without appropriate material limits.
Committee C15 on Manufactured Masonry Units

C 15.12 Alternative Masonry Materials and Related Units

- Many unit standards not “true” performance standards.

- These standards define unit characteristics that have been shown to perform well within the material limits allowed.

- C 15 Executive felt there was a need for a guide for Developing Specifications for Masonry Units.
Committee C15 on Manufactured Masonry Units

C 15.12 Alternative Masonry Materials and Related Units - have a ballot out

Work Item: ASTM WK43364 - New Guide for Developing Specifications for Masonry Units

1. Scope: This guide provides general guidelines for developing ASTM unit specification standards for Masonry units manufactured with constituent materials that are not included in current ASTM standard. ....
Committee C15 on Manufactured Masonry Units

**Background section ASTM WK43364**

4.1 **Traditional masonry materials**, such as clay and concrete, have a **long history of use as well as broad applications in masonry assemblies**. Unit Specifications and Test Methods for masonry units manufactured from these materials are well established and based on historical performance, empirical evidence as well as research and testing.

4.2 **Innovation creates opportunities** for units to be manufactured from non-traditional constituent materials not currently covered by any existing ASTM masonry unit material specification.
Background section ASTM WK43364

4.3 ASTM Specifications are not intended to standardize a proprietary product, but a type of product that manufacturers can use to ensure performance using those constituent materials or processes. ..... 

4.4 Masonry units manufactured from materials other than those explicitly defined in existing masonry unit specifications may require additional evaluation and assessment to ensure that the performance of such products meet or exceed performance attributes of the typical masonry assembly .....
Committee C15 on Manufactured Masonry Units

C 15.12 Alternative Masonry Materials and Related

Join the subcommittee on Tuesday 3-4pm to learn more and get involved.
Committee C12 on Mortars and Grouts for Unit Masonry

John Wathne

- President, Structure North Consulting Engineers, Inc.
- ASTM C12.03.03 Task Group Chair
Top 10 Reasons for Joining ASTM

Why Join ASTM?
Top 10 Reasons for Joining ASTM

1. Don’t have enough to do.
Top 10 Reasons for Joining ASTM

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2. Looks good on your resume.
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8. You can be take part in the development and review of standard specifications that are used in more than 30 countries.
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9. You can become a contributing author of these specifications.

10. You can take the lead in developing new standards that meet the needs of an ever-changing world, and make a lasting contribution to the public domain.
Personal Experience

My OWN personal experience....
As a Structural Engineer working in the field of Historic Preservation, I grew concerned that there was no “Historic Mortars” specification.
Personal Experience

I joined ASTM and found a task group working on the development of just that very specification.
After 10 years, I have learned a lot, made good friends, grown professionally and recently, as chair, completed and published C1713 Specification for Mortars for the Repair of Historic Masonry, which is the first of its type in the world.
Personal Experience

Has it been worth it?

Totally!
Committee C09 on Concrete and Concrete Aggregates

Jay Shilstone/ Jeff O’Leary
What is Committee C 09?

- Established in 1914
- Covers Properties of concrete and its constituents (except cement)
- Does not include design or construction of structures
- 46 subcommittees with additional task groups, divided into four groups:
  - Concrete Materials
  - Concrete Systems
  - Concrete Testing
  - Administration
What is Committee C 09?

- Responsible for over 170 standards
- Over 1400 members
- In conjunction with Committee C 01 on Cement, oversee the Cement & Concrete Reference Laboratory (CCRL) located at the National Institute of Standards (NIST).
  - CCRL operates laboratory inspection and proficiency sample programs
Current Activities within the following subcommittees

- Subcommittee C 09.40 on Ready-Mixed Concrete
  - ASTM C 94 *Standard Specification for Ready-Mixed Concrete*
  - Remove drum revolution limit

- Subcommittee C 09.20 on Normal Weight Aggregates
  - Work Item 36906 - new *Standard Specification for Ground Calcium Carbonate and other finely Divided Aggregate Mineral Filler for use in Concrete*
Current Activities within the following subcommittees

- Subcommittee C 09.50 on Risk Management for Alkali Aggregate Reactions
  - Work Item 32203 - new Guide for Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete

- Subcommittee C 09.66 on Concrete’s Resistance to Fluid Penetration
  - Work Item 37880 – new Test Method for Measuring the Surface Resistivity of Hardened Concrete Using the Wenner Four-Probe Electric Method
ASTM C 94 – removal of drum revolution limit

- Previous limit of 300 revolutions
  - Acceptable concrete rejected after only 300 revolutions
- In place since about 1935
  - Established when essentially no retarders or supplementary cementitious materials utilized
    - lack of set control
    - Mixers then were significantly slower
    - Combined factors equated to \( \approx 300 \) revs
Degradation of softer aggregate - originally thought to be detrimental

- current data does not indicate such
- heat generated – the temperature of the concrete is a measured and monitored property

The specifier or concrete producer can still limit the revolutions

- allows extended revolutions for the vast majority of concretes
- allows specifier/producer interaction to insure quality concrete without wasting material, increasing truck deliveries, etc

The specification provides guidance to the specifier
Work Item 36906 – New Specification for Ground CaCO$_3$ & Mineral Fillers

- The industry (and government) continues to stress green construction, sometimes with punitive restrictions
- Primary focus in concrete has been replacement or reduction of higher CO$_2$ producing constituents – cement
  - Supplementary Cementitious Materials, which actually improve concrete quality, have been primary mitigation materials
  - Most all SCM’s are bi-products
- GCC & AMF not only are traditionally bi-products, but can be beneficial to concrete as well
Work Item 36906 – New Specification for Ground CaCO$_3$ & Mineral Fillers

- GCC are typically screened, ground &/or classified products
- AMF can be processed in same fashion as GCC or simply fines collected from aggregate crushing
- GCC & AMF can improve particle packing density of concrete
- GCC can optimize the hydration of the cement
- European countries have been using these products for some time, and at very high quantities
- Some domestic companies have also been using these products in an effort to improve specialty mixtures, such as Self Consolidating Concrete
Work Item 36906 – New Specification for Ground CaCO$_3$ & Mineral Fillers

- Currently, the work item has 3 classifications of materials
  - >92% CaCO$_3$
  - 70% - 92% CaCO$_3$
  - no limit for CaCO$_3$
- Physical requirements
  - Strength activity $\geq$ 75% of control at 28 days
  - Water requirement $\leq$ 120% of control
- Proportions in concrete may be 10%-25% of total cementitious
  - The new ACI 211-N Guide for Proportioning Ground Limestone and Other Mineral Fillers in Concrete will help establish limits
Alkali Aggregate Reaction occurs between alkali from cement and reactive components of some aggregates.

AAR includes reactions with both siliceous and carbonate aggregates:

- Alkali Silica Reaction (ASR) occurs with siliceous aggregates.
- Alkali Carbonate Reaction (ACR) occurs with carbonate aggregates.

Both types of reactions result in expansion and subsequent cracking of concrete elements exposed to moisture.

ACR is much more difficult to prevent or migrate.
Work Item 32203 – New Guide for Reducing Risk of AAR in Concrete

The guide provides steps to follow:

• Recognizing exposure condition
• Identifying potential reactivity and level of risk
• Determining mitigation options
  • Reduce alkalis available from the cement
  • Improve density of the concrete
    • Use of SCM’s achieve both
  • Use of prescriptive or performance requirements
  • Use of lithium-based admixtures
  • Non-use of an aggregate
Work Item 32203 – New Guide for Reducing Risk of AAR in Concrete

Diagram:

- Field History:
  - Is there a proven history of satisfactory field performance following guidance in Section 7.1?
  - Yes
  - No

- Petrographic Examination:
  - Is the aggregate potentially reactive?
  - Yes
  - No

- Petrographic Examination:
  - Is the rock a quarried carbonate?
  - Yes
  - No

- Chemical Composition, CSA A23.2-20A:
  - Is composition potentially alkali-carbonate reactive?
    - Yes
    - No

- Either:
  - Alkali loading 1.8 kg/m³ (18 lb/yd³)
  - Concrete Prism Test, ASTM C 1105
    - Expansion ≤ limits in Section 7.6
      - Yes
      - No
  - Accelerated Mortar Bar Test, ASTM C 1269
    - Is 14-day expansion ≥ 0.10%?
      - Yes
      - No

- Concrete Prism Test, ASTM C 1293:
  - Is 1-year expansion ≥ 0.04%?
    - Yes
    - No

- Type of Reaction:
  - Is the expansion due to AAR or ASR?
    - AAR
    - ASR

- Increased Level of Risk of AAR:
  - Alkali-Silica Reactive
    - Take precautionary measures or do not use
  - Alkali-Carbonate Reactive
    - Avoid use

- Non-Reactive
  - Accept for use
  - No precautionary measures necessary
# Work Item 32203 – New Guide for Reducing Risk of AAR in Concrete

## TABLE 2 Determining the Level of ASR Risk

<table>
<thead>
<tr>
<th>Size and Exposure Conditions</th>
<th>Aggregate-Reactivity Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R0</td>
</tr>
<tr>
<td>Non-massive concrete in a dry environment</td>
<td>Level 1</td>
</tr>
<tr>
<td>Massive elements in a dry environment</td>
<td>Level 1</td>
</tr>
<tr>
<td>All concrete exposed to humid air, buried or immersed</td>
<td>Level 1</td>
</tr>
<tr>
<td>All concrete exposed to alkalies in service</td>
<td>Level 1</td>
</tr>
</tbody>
</table>

## TABLE 1 Classification of Aggregate Reactivity

<table>
<thead>
<tr>
<th>Aggregate-Reactivity Class</th>
<th>Description of Aggregate Reactivity</th>
<th>1-Year Expansion in Test Method C1293, %</th>
<th>14-Day Expansion in Test Method C1260, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0</td>
<td>Non-reactive</td>
<td>≤0.04</td>
<td>≤0.10</td>
</tr>
<tr>
<td>R1</td>
<td>Moderately reactive</td>
<td>≥0.04, &lt;0.120</td>
<td>≥0.10, &lt;0.30</td>
</tr>
<tr>
<td>R2</td>
<td>Highly reactive</td>
<td>≥0.120, &lt;0.240</td>
<td>≥0.30, &lt;0.45</td>
</tr>
<tr>
<td>R3</td>
<td>Very highly reactive</td>
<td>≥0.240</td>
<td>≥0.45</td>
</tr>
</tbody>
</table>
Work Item 32203 – New Guide for Reducing Risk of AAR in Concrete

TABLE 4 Determining the Level of Prevention

<table>
<thead>
<tr>
<th>Level of ASR Risk (Table 2)</th>
<th>Classification of Structure (Table 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class SC1</td>
</tr>
<tr>
<td>Risk Level 1</td>
<td>V</td>
</tr>
<tr>
<td>Risk Level 2</td>
<td>V</td>
</tr>
<tr>
<td>Risk Level 3</td>
<td>V</td>
</tr>
<tr>
<td>Risk Level 4</td>
<td>W</td>
</tr>
<tr>
<td>Risk Level 5</td>
<td>X</td>
</tr>
<tr>
<td>Risk Level 6</td>
<td>Y</td>
</tr>
</tbody>
</table>

TABLE 6 Minimum Levels of SCM to Provide Appropriate Level of Prevention

<table>
<thead>
<tr>
<th>Type of SCM (^4)</th>
<th>Alkali Content of SCM (%Na₂O)</th>
<th>Minimum Replacement Level(^D) (% by mass)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Level W</td>
</tr>
<tr>
<td>Fly ash (^a) (CaO ≤ 18%)</td>
<td>&lt; 3.0</td>
<td>15</td>
</tr>
<tr>
<td>3.0 - 4.0</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Slag Cement</td>
<td>&lt; 1.0</td>
<td>25</td>
</tr>
<tr>
<td>Silica Fume (^c) (SiO₂ &gt; 85%)</td>
<td>&lt; 1.0</td>
<td>2.0 x KGA or 1.2 x LBA</td>
</tr>
</tbody>
</table>
Work Item 37880 – New Test Method for Surface Resistivity of Concrete

- Corrosion of steel, sulfate attack, etc are some of the most critical durability issues the industry faces
- Successful mitigation methods continue to be developed – especially SCM’s
- Numerous test methods developed over the years – but none are efficient
  - Extensive sample prep required
  - Significant time to run the test
  - Costly
  - Not capable of testing in-place concrete
- Most commonly specified single method to evaluate concretes resistance to penetration is the Rapid Chloride Permeability Test
Work Item 37880 – New Test Method for Surface Resistivity of Concrete

- Rapid Chloride Permeability
  - Measures electrical conductance of the concrete in Coulombs
  - Laboratory test only & somewhat costly

- Surface Resistivity
  - Measures electrical resistivity of the concrete in KΩ-cm
  - Laboratory test
  - Can be corrected for field use
  - Minimal cost
  - Minutes to perform
Work Item 37880 – New Test Method for Surface Resistivity of Concrete

• Surface Resistivity (cont)
  • AC current applied between two outer electrodes
  • Voltage measured between two inner electrodes
  • Resistance is ratio of the measured voltage to applied current
  • Characterizes the rate at which concrete allows penetration
  • Florida DOT replaced the RCP test with the SR test
    • FDOT performed significant research not only against RCP, but all other methods
Work Item 37880 – New Test Method for Surface Resistivity of Concrete

<table>
<thead>
<tr>
<th>Penetrability</th>
<th>ASTM C1202 Charge Passed (C)</th>
<th>Surface Resistivity (kΩ-cm) (23 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>&gt; 4000</td>
<td>&lt; 6.5</td>
</tr>
<tr>
<td>Moderate</td>
<td>2000 – 4000</td>
<td>6.5 – 10</td>
</tr>
<tr>
<td>Low</td>
<td>1000 – 2000</td>
<td>10 – 20</td>
</tr>
<tr>
<td>Very Low</td>
<td>100 – 1000</td>
<td>20 – 140</td>
</tr>
<tr>
<td>Negligible</td>
<td>&lt; 100</td>
<td>&gt; 140</td>
</tr>
</tbody>
</table>
Providing Concrete Test Results to Concrete Producer

- ASTM C94-12 Para. 6.7 - The purchaser shall ensure that the manufacturer is provided copies of all reports of tests performed on concrete samples taken to determine compliance with specification requirements. Reports shall be provided on a timely basis.

- ACI 318-11 Para. 5.6.1 - All reports of acceptance tests shall be provided to the licensed design professional, contractor, concrete producer, and, when requested, to the owner and the building official.
Providing Concrete Test Results to Concrete Producer

Failure to provide test results may result in:

• Improper strength
• Failure to comply with building code requirements
• Elimination of test results as method for approving concrete
Jason Aspin

- WJE
New Practice for Electrical Conductance Methods for Locating Leaks in Exposed or Covered Waterproof Membranes
Low Voltage Vector Mapping

- Establishes an electric circuit. The membrane acts as an insulator and breaches allow current to flow.
- Power source grounded to conductive deck.
- Membrane is wetted and an exposed wire charges the water.
- Probes detect direction of current flow.
Vector Mapping
Low Voltage Scanning Platform

- Platform with a perimeter metal sweep and an isolated center sweep.
- Power source grounded to conductive deck.
- Membrane is wetted and sweeps charge the water.
- Outer sweep detects breaches in test area. Inner sweep detects breaches below platform.
Scanning Platform
Scanning Platform
Low Voltage Limitations

- Requires conductive substrate. Can add metal mesh under the membrane.
- Dry surfaces are not tested/Dry breaches not detected.
- Overburden limits accuracy.
- Can not test conductive membrane (EPDM) or adhered systems with vapor retarders.
Low Voltage Substrates
High Voltage

- Broom with charged metal bristles
- Power source grounded to conductive deck
- Broom is swept over membrane, electric arcs jump from the broom through breaches.
High Voltage Limitations

- Membrane must be dry and exposed.
- Can not test conductive membrane (EPDM).
- Membrane thickness must be known.
- Operator must be isolated and protected from voltage source.
Sustainable Roofing: a system that is designed, constructed, and maintainable throughout its service life, with an emphasis on using natural resources efficiently and preserving the environment.
ASTM D08.24 Sustainability

- D.08.24.01 – Sustainable Design Guidelines
- D.08.24.02 – Life Cycle Analysis
- D.08.24.03 – Recycling Practices
- D.08.24.04 – Durability
- D.08.24.05 – Veg. Roofing Selection Criteria
Kevin Shanahan

- ASTM C12, C15 Staff Manager
Overview - ASTM International

- Founded in 1898
- Developing voluntary, consensus standards for materials, products, systems & services
- Published more than 12,000 standards
- Standards are continually reviewed and updated to reflect current technology/trends
- Over 35,000 members from 145 countries
Previously known as - American Society for Testing & Materials, name changed in 2001

ASTM International is a non-profit organization headquartered in West Conshohocken, PA

One of the largest voluntary standards development organizations (SDO) in the world

Sustains its operations through the sales of its intellectual property (standards & publications)
Introduction to ASTM International

144 Technical Committees
90 Different Industry Sectors
Members determine need, staff assists administratively with process

Example Committees:
- A01 on Steel
- C16 on Thermal Insulation
- E50 on Environmental Assessment
- C09 on Concrete and Concrete Aggregates
- D02 on Petroleum Products and Lubricants
- D20 on Plastics
- F04 on Medical and Surgical Materials and Devices
Opportunity for all stakeholders to participate in the standards development process

Every member has equal say

Consensus-based procedures

Stakeholders on ASTM Committees:
- Product Manufacturers
- Regulatory Agencies
- End Users – engineers, architects, contractors
- Academia
How ASTM works...
Technical Committees form to address specific industry needs

Subcommittees are established to address subsets of specialized subject matter

Subcommittees organize their expertise into Task Groups to write standards
Balloting

- Documents are drafted and revised in the task group
- New standards are required to be balloted at the subcommittee level at least once
- After subcommittee approval, the main committee & entire Society
Technical committees are “classified” and “balanced”

Committee Members are “classified” as one of the following: Producer, User, General Interest, or Consumer

“Balance” in ASTM means that committees have more User, General Interest, and Consumer members than Producer members

Only one official vote is assigned per company.

Every member receives ballots and should vote
Member Expectations

- ASTM requires all participating members with the official vote to return ballots
  - Review standards activity in the committee
  - ASTM’s website facilitates this
    - www.astm.org
Process for a New Standard

Idea for New Standard

Executive Subcommittee Approval – Assign Subcommittee

Subcommittee Approval

Establish Task Group

Publicize, Gain New Experts in Area
For a revision, the standard & subcommittee are already established

Approval by Subchair or a motion at a meeting

- Technical contact may already be identified
- Establish a Task Group, register a Work Item
Process for a Revision to Existing Standard

Approval for revision at Subcommittee meeting or by Subchair

Establish a Task Group

Register Work item

Prepare draft to review and ballot

Submit Item for ballot
ASTM Standards are voluntary consensus standards

Become Mandatory when:
  • Cited in a contract
  • Government agencies reference them in codes, certification, regulations, and laws (US: P.L. 104-113)
Jacksonville December Committee week

- All technical meetings are open and free to attend
- Meetings relating to these presentations:
  - C12.03.03 Task Group on Historic Mortars - Tuesday at 1-3 pm in City Terrace 11
  - C15.12 Subcommittee on Non-Traditional Masonry Units – Tuesday 3 pm – 4 pm in City Terrace 9
  - C15.03.01 Unit Specifications – Wednesday 9 – 10:30 am in City Terrace 10
Meetings relating to these presentations:

- C09.40 Subcommittee on Ready-Mixed Concrete Tuesday 8 am – 12 noon in Grand Ballroom 2
- C09.20 Subcommittee on Normal Weight Aggregates Tuesday 10 am – 12 noon in Grand Ballroom 1
- C09.50 Subcommittee on Risk Management for Alkali Aggregate Reactions Tuesday 3 pm – 5 pm in Grand Ballroom 6
- C09.66 Subcommittee on Concrete’s Resistance to Fluid Penetration Tuesday 12 noon in Grand Ballroom 7
COMMITTEE SCHEDULE AND MEETING INFORMATION

The following committee meetings will take place over the dates in parentheses at the Hyatt Regency Jacksonville Riverfront. Committee schedules and registration information are available 10 - 12 weeks prior to the meeting date. You may access the committee schedules by clicking the appropriate committee designation link.

<table>
<thead>
<tr>
<th>COMMITTEES</th>
<th>DATES</th>
<th>STAFF MANAGER</th>
<th>PHONE (610) 832-</th>
<th>Register</th>
</tr>
</thead>
<tbody>
<tr>
<td>C01 on Cement</td>
<td>(11-12)</td>
<td>W Scott Orthey</td>
<td>(9730)</td>
<td>Register</td>
</tr>
<tr>
<td>C07 on Lime</td>
<td>(10-12)</td>
<td>Kevin Shanahan</td>
<td>(9737)</td>
<td>Register</td>
</tr>
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<td>(09-12)</td>
<td>Kevin Shanahan</td>
<td>(9737)</td>
<td>Register</td>
</tr>
<tr>
<td>C17 on Fiber-Reinforced Cement Products</td>
<td>(10)</td>
<td>Rick Lake</td>
<td>(9689)</td>
<td>Register</td>
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<tr>
<td>C27 on Precast Concrete Products</td>
<td>(10-11)</td>
<td>Joseph Hugo</td>
<td>(9740)</td>
<td>Register</td>
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<tr>
<td>D01.44.00 on Traffic Coatings</td>
<td>(10)</td>
<td>Jeffrey Adkins</td>
<td>(9738)</td>
<td>Register</td>
</tr>
<tr>
<td>D04 on Road and Paving Materials</td>
<td>(10-12)</td>
<td>Daniel Smith</td>
<td>(9727)</td>
<td>Register</td>
</tr>
<tr>
<td>D08 on Roofing and Waterproofing</td>
<td>(08-11)</td>
<td>Joseph Hugo</td>
<td>(9740)</td>
<td>Register</td>
</tr>
<tr>
<td>D11 on Rubber</td>
<td>(08-11)</td>
<td>Joe Koury</td>
<td>(9804)</td>
<td>Register</td>
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<td>D24 on Carbon Black</td>
<td>(09-11)</td>
<td>Joe Koury</td>
<td>(9804)</td>
<td>Register</td>
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<td>E05 on Fire Standards</td>
<td>(09-12)</td>
<td>Thomas O'Toole</td>
<td>(9739)</td>
<td>Register</td>
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<td>E12 on Color and Appearance</td>
<td>(12-13)</td>
<td>Thomas O'Toole</td>
<td>(9739)</td>
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<td>(09-10)</td>
<td>Rick Lake</td>
<td>(9689)</td>
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<td>E36 on Accreditation &amp; Certification</td>
<td>(09-10)</td>
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<tr>
<td>F25 on Ships and Marine Technology</td>
<td>(11-12)</td>
<td>Robert Morgan</td>
<td>(9732)</td>
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Wrap up

Benefits of being an ASTM member

• Participation in development of ASTM Standards
• Exposed to state of art information
• Networking
Thank you for your attention

- John Wathne
- Mark McGinley
- Jay Shilstone/Jeff O’Leary
- Jason Aspin
ASTM International Workshop for Local Architects, Engineers and Contractors

- Questions?

- Masonry Hospitality Suite is hosting the reception