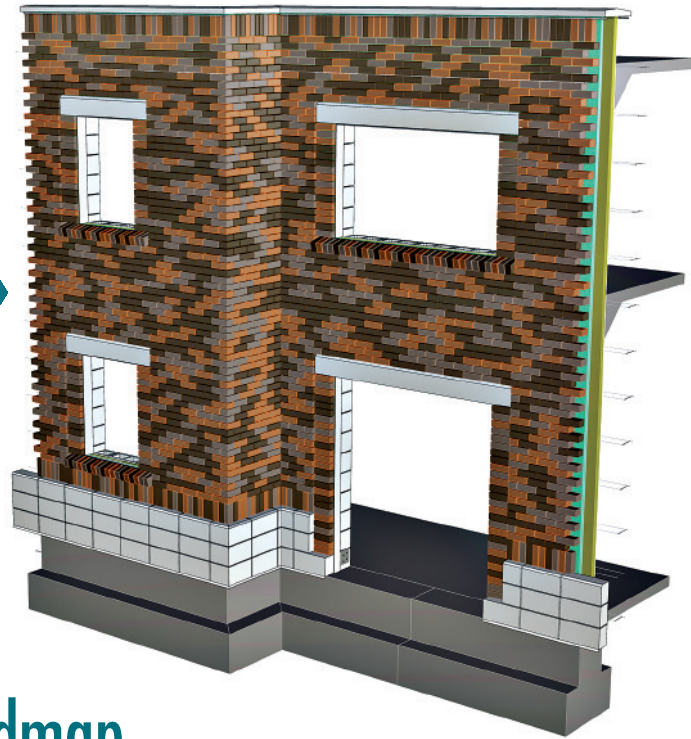
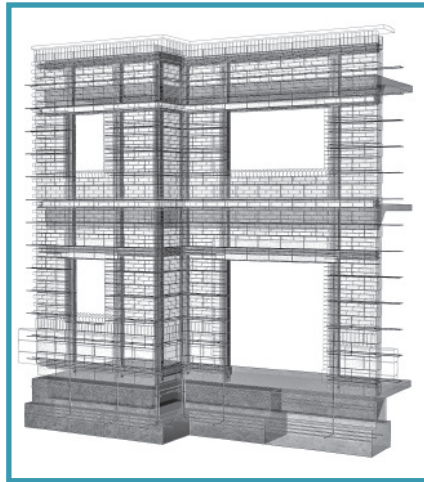


# The Future of Masonry Design and Construction

IMAGES COURTESY GEORGIA TECH DIGITAL BUILDING LAB



## BIM for Masonry Initiative: An International Roadmap

**BIM is an acronym** that stands for an object, a “building information model” and also a process for creating and using that object, “building information modeling”. The BIM model provides a digital representation of the building, so that the modeling and analysis tools used by architects, engineers, constructors, managers and owners can read from and write to the same information source.

The Building Information Modeling for Masonry Initiative (BIM-M) recently completed a roadmap for developing masonry BIM requirements in five key areas: architectural parametric modeling,

structural modeling and analysis, masonry construction activities, construction management, and masonry materials. The BIM-M program coordinator is **David T. Biggs** of **Biggs Consulting Engineering** located in Troy, New York. David is no stranger to seminar attendees at the **Masonry Institute of St. Louis (MISL)**, having served as guest speaker on numerous occasions. He returns this Fall to open up the 2013-2014 seminar season and provide an update to the BIM-M initiative. Recently, **Darrell McMillian** of the MISL had an opportunity to discuss the topic further with David.

CONTINUED ON PAGE 2

# The Future of Masonry Design and Construction

## CONTINUED FROM THE COVER

**MISL:** First of all David, thank you for agreeing to speak for us again this year. Your talks are very informative and well received.



**Biggs:** Thanks Darrell. I always enjoy visiting the St. Louis area and speaking for your attendees. MISL does a great job providing local technical masonry information.

**MISL:** Can you summarize for our readers what BIM-M is?

**Biggs:** Sure, BIM-M is a collaboration of masonry industry partners from the United States and Canada that was formed for the sole purpose of developing new digital technologies for the benefit of all involved in the design, construction and maintenance of masonry systems and the supply of masonry materials.

**MISL:** Aren't masonry materials in BIM software and processes now?

**Biggs:** Sadly, no. Competing structural materials have been leading BIM development while masonry has not been represented. BIM-M is intended to correct that and provide a pro-active approach on behalf of the masonry industry.

**MISL:** Is the "roadmap" a part of that effort?

**Biggs:** A very important part and a critical first step. The BIM-M roadmap outlines phases, projects, and timelines that the masonry industry must undertake to prepare the technical foundation for the development and distribution of a future BIM-M products. It was developed by key



POSSIBLE BIM-M MATERIAL STAGING TOOL.

industry stakeholders in conjunction with Georgia Tech's Digital Building Laboratory.

**MISL:** It appears that stakeholder collaboration has been crucial, would you agree?

**Biggs:** Absolutely. As often happens, an organization's greatest strengths can also present the greatest challenges. The stakeholders in the masonry industry are a diverse set of institutions representing various, and in some matters, divergent, interests. Masonry encompasses many material types and is widely used in both residential and commercial construction. Fortunately, the masonry industry recognized that a commitment to BIM-M is important for all facets of the industry.

**MISL:** Has that spirit of collaboration carried over into the funding side of things?

**Biggs:** Here is where I have been extremely impressed with the masonry industry: The BIM-M initiative is a very large undertaking and our current projected need is an ambitious \$2.5 million over the next five years. In response, the pledges for monetary support from our masonry partners have been strong and continue to grow. The initiative is also seeking additional funding from outside sources interested in supporting industry wide BIM development.

**MISL:** The term "clash detection" is often used when discussing BIM, will that be included in BIM-M?

**Biggs:** That is one benefit of the BIM process when the software is capable of providing it. Clash detection allows the user to see how different materials will go together prior to construction and discover if any interferences may occur. We will certainly include that feature for masonry materials, but hopefully the BIM-M tools will go way beyond that.

**MISL:** What might some of those additional tools be?

**Biggs:** Well, to name just a few: material and wall assembly definitions; fully interoperable A/E modeling; job costing; material staging; project scheduling; construction safety tools. I'll be able to expand on those concepts, and much more, during my upcoming presentation.

**MISL:** Looking forward to it. Thanks for the visit and keep up the good work. See you in St. Louis!

# 2013 2014 SEMINAR SCHEDULE

## MASONRY INSTITUTE OF ST. LOUIS

In 1971, a trust fund was established to promote the use of masonry materials. Through this trust fund, the Masonry Institute of St. Louis was created to serve as the promotional and technical arm in the Missouri counties of the Greater St. Louis masonry industry.

## REGISTERED PROVIDER

The Masonry Institute of St. Louis is a Registered Provider with the AIA Continuing Education System. Participants in all workshops presented by MISL earn Continuing Education Credits. A certificate showing credit earned is mailed annually in December. Most seminars earn AIA HSW credits and satisfy state Professional Development Hour (PDH) requirements for Architectural and Engineering licensure.

## MISSION STATEMENT

The purpose of the Masonry Institute of St. Louis is to promote the use of quality masonry materials and union masonry construction by serving as an educational and promotional resource for the use of brick, stone, glass and concrete masonry products in the commercial and residential markets.

*Masonry Institute of St. Louis seminars are profession-specific. However, everyone is welcome to attend all programs.*



## 2013 MISL Contributors

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Certified  
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Credits



AIA  
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# 2013 2014 ARCHITECTURAL SEMINARS

## **BIM FOR MASONRY INITIATIVE (BIM-M): AN INTERNATIONAL ROADMAP**

Wednesday, September 25, 2013

**Speaker:** David T. Biggs, BIM-M Coordinator

Recently, the Building Information Modeling for Masonry Initiative (BIM-M) released a roadmap for masonry related BIM development in five key areas: architectural parametric modeling, structural modeling and analysis, masonry construction activities, construction management, and masonry materials. In addition, the BIM-M effort became international as the Canadian masonry industry has become a partner. Join David Biggs as he introduces the overall initiative, provides background on the development of the BIM-M roadmap, and highlights key aspects of future masonry BIM development.

**Sponsor:** **Irwin Products, Inc.**  
[www.IrwinProducts.com](http://www.IrwinProducts.com)

## **DESIGNING & DETAILING DURABLE MASONRY WALLS**

Wednesday, October 30, 2013

**Speaker:** Pat Conway, International Masonry Institute

Pat Conway joins us to review moisture, air, vapor and thermal control concepts for masonry walls and explains where to locate these control layers to create long lasting durable masonry walls that have the ability to drain and dry. Many contemporary details and installation photos will be presented to demonstrate options for water-resistant barriers, air barriers, flashing, end dams, weep vents, veneer ties, insulation and movement joints.

**Sponsor:** **Trends in Masonry**  
[www.TrendsInMasonry.com](http://www.TrendsInMasonry.com)

## **COMMUNITY FUNCTIONAL RESILIENCE**

Wednesday, November 20, 2013

**Speaker:** Jason Thompson  
National Concrete Masonry Association

Human and material losses from disaster events have increased exponentially over the last 30 years. While the sustainability movement has focused on the environmental aspects of buildings, the discussion has now been widened to address the need for resilience while rebuilding in preparation for potential future disasters. Join Jason Thompson for an overview of this timely topic including, linking resiliency and sustainability, community hazard types and risks, and identifying risks for your own community.

**Sponsor:** **Midwest Block & Brick**  
[www.MidwestBlock.com](http://www.MidwestBlock.com)

## **HIGH PERFORMANCE MASONRY: ENERGY AND THERMAL MASS**

Wednesday, January 29, 2014

**Speaker:** Maria Viteri, International Masonry Institute

Envelope performance continues to be a topic of importance for building designers. This seminar focuses on the connections between sustainability and high performance masonry walls, specifically looking at ASHRAE 90.1, and current insulation requirements. The discussion will also show how thermal mass contributions from masonry can be utilized to further enhance whole building performance.

**Sponsor:** **Mason Contractors Association of St. Louis**  
[www.MasonryStLouis.com](http://www.MasonryStLouis.com)

## **16<sup>TH</sup> ANNUAL MISL NEW PRODUCTS SHOW**

Wednesday, February 5, 2014

**Time:** 11:00 AM to 2:00 PM

The MISL product show is back by popular demand. Join us to discover what's new, different, or even the same about great masonry products. This is a "not to miss" show for anyone in the building design and construction communities.

**RSVP not required**

**Sponsors:** **MISL Supplier Contributors**

## **CONDITION ASSESSMENT OF MASONRY FAÇADES**

Wednesday, March 26, 2014

**Speaker:** Michael P. Schuller, Atkinson-Noland & Associates

Join Michael Schuller for an overview of TMS 1700-12, Guide for Condition Assessment of Masonry Facades. The guide, published by the Masonry Society, is useful to building owners, designers, and building officials as a valuable tool for evaluation related to façade ordinances, restoration and repairs, maintenance programs, etc. Discussion to include factors that affect masonry performance, façade inspection processes, and assessment techniques for in-place masonry.

**Sponsors:** **B&K Tuckpointing**  
[www.BandKTuckpointing.com](http://www.BandKTuckpointing.com)

**Gateway Waterproofing & Restoration**  
[www.GatewayWaterproofing.com](http://www.GatewayWaterproofing.com)

## **CONTEMPORARY BRICK DESIGN**

Wednesday, April 30, 2014

**Speaker:** J. Gregg Borchelt, Brick Industry Association

Arches, corbelling, quoins, bands... how are these achieved with brick? Gregg Borchelt will show us, and also explain how to accomplish many interesting design features using brick shapes and bond patterns. In addition, Gregg will take a special look at brick sculpture, and some award-winning buildings that incorporate interesting new ideas using brick.

**Sponsor:** **Heitkamp Masonry**  
[www.HeitkampMasonry.com](http://www.HeitkampMasonry.com)

## **ST. LOUIS MASONRY "THEN AND NOW"**

Wednesday, May 28, 2014

**Speaker:** Darrell McMillian, MISL

Join Darrell McMillian as he explores the "then and now" of masonry construction in the St. Louis region. Discussion to include: St. Louis area history as it relates to local masonry construction, development of the St. Louis clay and concrete masonry industries, post-World War II changes to solid masonry construction, and the contribution over the years of mason contractors and bricklayers to the local built environment.

**Sponsor:** **Spencer Brickwork**  
[www.SpencerBrickwork.com](http://www.SpencerBrickwork.com)

All Architectural seminars are at the St. Louis Masonry Center, 1429 South Big Bend Boulevard, from Noon - 1 PM unless otherwise noted. Lunch is provided. Vegetarian meals are available upon prior request.

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ST. LOUIS  
MASONRY  
CENTRE

# 2013 2014 ENGINEERING SEMINARS

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## **BIM FOR MASONRY INITIATIVE (BIM-M): AN INTERNATIONAL ROADMAP**

TUESDAY, September 24, 2013

**Speaker:** David T. Biggs, BIM-M Coordinator  
Recently, the Building Information Modeling for Masonry Initiative (BIM-M) released a roadmap for masonry related BIM development in five key areas: architectural parametric modeling, structural modeling and analysis, masonry construction activities, construction management, and masonry materials. In addition, the BIM-M effort became international as the Canadian masonry industry has become a partner. Join David Biggs as he introduces the overall initiative, provides background on the development of the BIM-M roadmap, and highlights key aspects of future masonry BIM development.

**Sponsor:** *Irwin Products, Inc.*  
[www.IrwinProducts.com](http://www.IrwinProducts.com)

## **ALLOWABLE STRESS & STRENGTH DESIGN COMPARISON: OUT-OF-PLANE**

Wednesday, October 23, 2013

**Speaker:** Darrell McMillian, MISL  
For several code cycles the Masonry Standards Joint Committee (MSJC) has been harmonizing wall design results between Allowable Stress Design (ASD) and Strength Design (SD) when using TMS 402. Join Darrell McMillian as he gives an overview to out-of-plane harmonization including harmonization goals, relevant code changes, and the effect current ASD and SD procedures can have on building design. The discussion will also include sample wall designs for varying building parameters.

**Sponsor:** *Quikrete/Spec Mix*  
[www.Quikrete.com](http://www.Quikrete.com)

## **COMMUNITY FUNCTIONAL RESILIENCE**

TUESDAY, November 19, 2013

**Speaker:** Jason Thompson  
National Concrete Masonry Association  
Human and material losses from disaster events have increased exponentially over the last 30 years. While the sustainability movement has focused on the environmental aspects of buildings, the discussion has now been widened to address the need for resilience while rebuilding in preparation for potential future disasters. Join Jason Thompson for an overview of this timely topic including, linking resiliency and sustainability, community hazard types and risks, and identifying risks for your own community.

**Sponsor:** *Midwest Block & Brick*  
[www.MidwestBlock.com](http://www.MidwestBlock.com)

## **STRUCTURAL MASONRY CASE STUDIES**

Wednesday, January 15, 2014

**Speaker:** Scott Walkowicz, Walkowicz Consulting Engineers  
Sometimes the best way to learn is by example. Utilizing a case study format, Scott Walkowicz will highlight 6 projects that use a variety of structural masonry solutions from traditional loadbearing to specialty applications. The case studies follow the projects from design through construction, and will focus on how masonry's variety and flexibility of design can be applied structurally to solve numerous situations faced by designers on real-world projects.

**Sponsors:** *MISL Supplier Contributors*

## **16<sup>TH</sup> ANNUAL MISL NEW PRODUCTS SHOW**

Wednesday, February 5, 2014

**Time:** 11:00 AM to 2:00 PM

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**RSVP not required**

**Sponsors:** *MISL Supplier Contributors*

## **INVESTIGATING MASONRY STRUCTURES: NONDESTRUCTIVE TECHNIQUES**

TUESDAY, March 25, 2014

**Speaker:** Michael P. Schuller, Atkinson-Noland & Associates  
The use of nondestructive, minimally invasive, evaluation methods are valuable, and in some cases necessary, when determining properties required for the design and use of existing masonry structures. Michael Schuller discusses current evaluation techniques without excessive damage or expensive sample removal. Partial list of topics; flatjack testing, surface penetrating radar, infrared thermography, and fiber optic borescopes.

**Sponsor:** *Grant Contracting Co., Inc.*  
[www.GrantContracting.com](http://www.GrantContracting.com)

## **LOADBEARING BRICK MASONRY**

TUESDAY, April 29, 2014

**Speaker:** J. Gregg Borchelt, Brick Industry Association  
Clay brick is one of the strongest materials, but it is currently used more for veneers than for loadbearing applications. Join Gregg Borchelt as he shows how brick masonry can be used as a viable loadbearing option in today's construction market. Discussion to include various brick loadbearing applications, including hollow clay units, code requirements, and available loadbearing brick design resources.

**Sponsor:** *Acme Brick*  
[www.Brick.com](http://www.Brick.com)

## **INTERNATIONAL EXISTING BUILDING CODE (IEBC)**

Wednesday, May 21, 2014

**Speaker:** Phillip Shinn, Jacobs

The IEBC encourages the use and reuse of existing buildings that adequately protect public safety without unnecessarily increasing rehabilitation costs. Join Phillip Shinn for an IEBC overview from the engineer's perspective. Topics to include; 2009 IEBC scope and format, the relationship between the IEBC and IBC Chapter 34, the three EBC options for dealing with existing buildings, and key provisions dealing with existing masonry buildings.

**Sponsor:** *Enloe Enterprise LLC*  
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**RIDING THE STORM OUT:  
A LOOK AT RECENT WIND EVENTS**

Wednesday, October 9, 2013

Speaker: Stephen Gantner, Jr., Cannon Design

Join Steve Gantner, Missouri S.A.V.E coalition member, as he discusses building damage caused by recent wind events, both locally and regionally. The discussion will include photos of windstorm damage, codes and standards for ensuring life safety during wind events, incorporating wind event provisions into project documents, and how masonry materials and construction can be used to satisfy wind event project requirements.

Sponsor: **Lemay Concrete Block**  
[www.lemayblock.com](http://www.lemayblock.com)

**BASIC MASONRY: OLD AND NEW**

Wednesday, December 11, 2013

Speaker: Edgar F. Glock, Jr., Glock Architecture

Overview of masonry topics related to new construction and existing buildings. Quality assurance related topics for new masonry to include basic wall systems and components, grouting procedures, moisture prevention, movement joints, hot and cold weather construction and more. The existing masonry portion will look at basic approaches to evaluating existing masonry facades and discuss solutions from recent projects.

Sponsor: **John J. Smith Masonry Co.**  
[www.smithmasonry.com](http://www.smithmasonry.com)

**MASONRY RETAINING WALL OPTIONS**

Wednesday, April 9, 2014

Speaker: Darrell McMillian, MISL

A retaining wall is a structure designed and constructed to resist the lateral pressure of soil when there is a desired change in ground elevation. Join Darrell as he explores using masonry materials for this purpose including; retaining wall types, typical code related requirements, and masonry retaining wall options.

Sponsor: **Midwest Block & Brick**  
[www.midwestblock.com](http://www.midwestblock.com)



All Code Officials seminars are at the St. Louis Masonry Center, 1429 South Big Bend Boulevard, from Noon – 1 PM unless otherwise noted. Lunch is provided. Vegetarian meals are available upon prior request.

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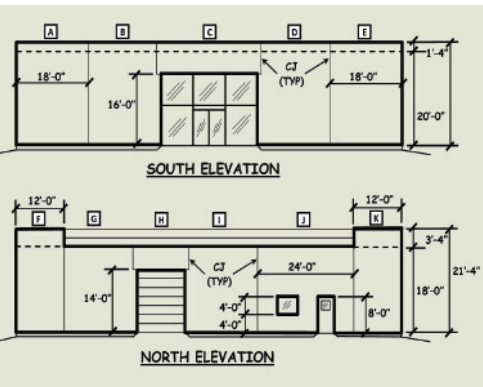


# University Offers Classroom and Online

BY DARRELL MCMILLIAN, P.E.

THIS ARTICLE IS AN  
ABRIDGED REPRINT FROM  
SMART | DYNAMICS OF  
MASONRY, VOL. 1, NO. 1.

The discussion about why more structural masonry is not taught at the university level is an interesting one. I certainly have my theories. For one, until the 1960s, masonry building design fell almost completely to the architect. Empirical rule of thumb masonry wall design was the norm and needed little input from the structural engineer. This is not the case today with more stringent seismic and wind code provisions that typically require analysis by a structural engineer.



TYPICAL BUILDING TYPE USED FOR ANALYSIS DURING MISSOURI S&T'S MASONRY DESIGN COURSE.

This history partially caused structural masonry education to arrive late at the university curriculum table, where concrete and steel were already seated and had placed their orders. Another factor could be due to one of masonry's greatest strengths, its diversity. Numerous masonry materials and installation options are great for design

flexibility, but require many industry stakeholders. In the past, this diversity may have hampered the type of industry-wide initiative and funding needed to secure masonry a place among the other material types at the university level.

There are some very good university-level masonry courses available. But masonry education certainly hasn't come close to saturating the university system as have concrete and steel. Ironically, in spite of not having the opportunity to take a structural masonry course at the university level, the first project newly hired structural engineers are given is often masonry related.

## INDUSTRY COLLABORATION

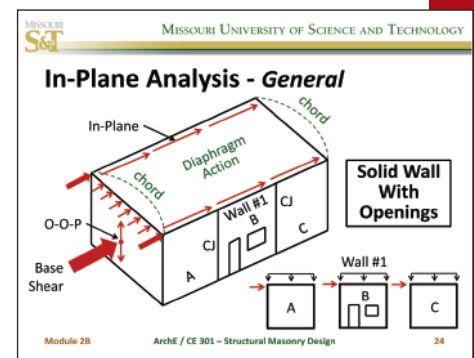
Things are changing. The masonry industry has recently come together successfully to form the Building Information Modeling for Masonry Initiative (BIM-M). This important effort is working to accomplish more masonry information being implemented into current and future building information modeling processes and software. This level of industry cooperation will hopefully carry over into other areas such as university level structural masonry education. What is being done here locally in Missouri could have exciting industry-wide implications.

## STRUCTURING THE COURSE

In 2002, I had the great pleasure of meeting and getting to know Dr. John Myers, structural engineering professor at Missouri S&T. At the time, Myers was heavily involved with the development of an architectural engineering program at Missouri S&T, which became a reality in 2004.

Although this new program included coverage of masonry materials, Myers and I often discussed the need for a dedicated structural masonry design course. Myers shared my belief that there would be student interest, but he advised making the course as flexible as possible to maximize actual enrollment, which is critical for a new offering. It should be an elective for both civil and architectural engineering programs and available to both undergraduate and graduate students. In addition, the course should utilize Missouri S&T's great distance education technology. This would open it to not only students at the main campus, but also at satellite locations, as well as off-campus students, such as practicing engineers, who could take the course remotely, allowing for more flexibility with their schedules.

Over the next year, we developed course content, materials and lecture sequence. The main goal was to provide up-to-date information for design of low-rise concrete masonry buildings. This information would allow newly-hired graduates to immediately participate in the design of such structures, as well as give engineers already working an opportunity to add masonry design to their knowledge bases or advanced structural degree efforts. Myers skillfully shepherded the course through the academic approval process. Structural Masonry Design was first offered in fall of 2011. Myers and I co-taught the course. He participated with students on campus, while I joined the class remotely from Missouri S&T's Engineering Education Center (EEC) in St. Louis. Enrollment included under graduate and graduate students, architectural engineering students, civil engineering students and practicing engineers.



TYPICAL SLIDE OF MATERIAL COVERED IN STRUCTURAL MASONRY DESIGN, A MASONRY ENGINEERING COURSE OFFERED BY MISSOURI S&T. A PARTICULAR WALL BEING ANALYZED FOR IN-PLANE AND OUT-OF-PLANE WIND LOADS.

CONTINUED ON BACK COVER



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St. Louis, MO 63117

**MASONRY** is a publication of the Masonry Institute of St. Louis.

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## University Offers Classroom & Online CONTINUED FROM PAGE 7

Structural Masonry Design needs to be offered three times with adequate enrollment in order to be given a permanent listing in the university catalog. To that end, it was offered a second time in the fall of 2012, and I served as sole instructor. Once again, student distribution was evenly split between on-campus and distance education. Since it is important for continuing strong enrollment to strike a balance between student demand and the course frequency, the course will not be offered again until the spring of 2014. Currently, Structural Masonry Design is the only dedicated masonry course offered at Missouri S&T, but if student interest remains strong, an additional masonry course may be developed to expand the coverage to advanced design topics such as prestressed masonry, autoclaved aerated concrete (AAC) and fiber reinforced polymer (FRP) strengthening of existing masonry structures. This progression of introductory to advanced course work is comparable to what already exists at the university for concrete and steel design.

Reflecting back on the process, I had not expected to take on the role of instructor. My main goal was to serve by rallying industry support for the course in terms of reduced-cost text books, masonry codes and design software for the students. Industry response was tremendous, and in

particular, the help from the Concrete Masonry Association of California and Nevada and Midwest Block & Brick in St. Louis was instrumental in providing student-related materials. Fortunately, time spent as instructor for the course has been a great education to the possibilities of online distance education and, to me, is the most exciting part of the story.

### ***DISTANCE EDUCATION TECHNOLOGY***

Current distance education technology really does get us beyond the brick and mortar constraints of the past. Instructors can be on one campus, students on another. Off-campus students with internet access can participate real-time with instructors and on-campus students. Students from other universities can take distance courses, and when completed, transfer the credit back to their own engineering programs. The flexibility provided by distance education technology greatly increases the distribution potential of technical information, especially for courses without widespread offerings such as structural masonry. The success of the new masonry design course at Missouri S&T indicates that structural masonry education is online and on target!

