

The Voice

SEPTEMBER 2012

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A case study in BIM implementation and advantages

by *Jeremy Salmon, PE, SE, LEED AP*
Associate Principal
Structural Design Group

Building Information Modeling (BIM) has developed from an industry buzz word into a common process used in a growing number of AE projects. The digital model enables the owner, contractor, and design team to not only view a three dimensional representation of the building, but also allows access to non-graphical information about the building. For example, partition walls are not just visible in the model, but the type of gypsum board, steel stud size, and paint color are also accessible in the model.

While more time consuming and more complicated than 2D drawing, BIM offers many advantages to the design and construction industry. BIM has proved to facilitate the construction process and eliminate many problems and conflicts before they arise in the field.

Case study in use of BIM

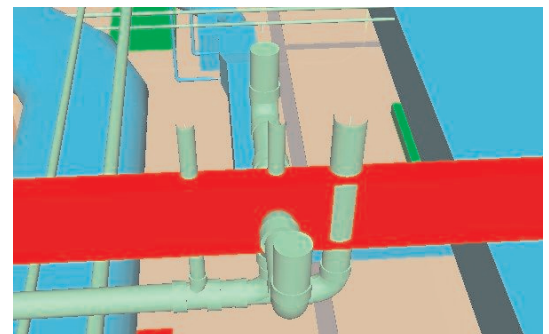
Structural Design Group used BIM on a new replacement hospital and medical office building in Smyth County, Virginia. The \$42 million design-build project consisted of a 150,000 square foot, 44-bed hospital with

three stories and a lower basement level. The exterior veneer was brick on metal stud back-up. The structure consisted of structural steel with composite floor slabs and was founded on micropiles. Steel moment frames served as the lateral-resisting system and grade beams were provided between pile caps. A powerhouse was included with masonry walls and steel braced frames.

Advantage of clash detection

Each consultant created a 3D model in either Microstation or Revit. Despite the different drawing platforms, the contractor was able to use Navisworks, an Autodesk software program, to create one integrated model in which the architecture, structure, plumbing, electrical, mechanical, etc. could all be viewed at the same time. Clashes – or interference with these systems – were detected in several locations, including the following:

(continued on page 3)



BIM revealed piping conflicts with a steel beam.

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Count the benefits of the Joint Annual Meeting

*by Steven Field, PE**President, ACEC of Tennessee*

ACEC and TSPE have made a strategic partnership with ASCE for the three groups to host a joint meeting on **September 13 and 14**. How will this benefit member firms? Let me count the ways!

**Steven Field**

1. The annual meeting will offer a wider range of technical sessions. The program offers four technical tracks so attendees can increase their technical knowledge and learn more about programs and services needed by our clients. Among the topics are the

Mitigation In-Lieu Fee program, Engineering Ethics, and TVA Renewable Energy programs to name just a few. *Plus* — the technical program will meet most PDH requirements for the year at an extremely reasonable price!

2. There will be increased opportunity to network with peers, mentors and potential clients. With the membership of three statewide organizations involved, there will be more opportunity to connect with colleagues at a time when teaming partners are needed on many of the projects we pursue.

3. There will be opportunity to support the next generation of students in math, science and engineering. The proceeds from The Tennessee Engineering Foundation (TEF) luncheon on September 13 are directly funneled into the TEF coffers for MathCounts and for scholarships for college students studying engineering. TDEC Commissioner Bob Martineau will be the featured speaker.

4. Attendance supports the statewide organizations. This event is a source of funding for the ACEC & TSPE operating budgets — the budget that supports the organizations' many activities on your behalf throughout the year.

5. It's an opportunity to directly support efforts to protect our profession on the legislative front. Through the Tennessee Professional Engineers' Political Action Committee (TPE PAC), our voice can be heard on the issues that are important to our profession and industry. The PAC Auction on September 13 is always fun and full of surprises. Participate and spend some dough to raise funds to support PAC activities!

For these reasons, I cannot understand why you wouldn't plan to attend this year's annual meeting and join ACEC/TSPE/ASCE as we begin *Partnering for the Future*. Go to www.acectn.org/Events.htm to sign up today.

Thank you to all of our event sponsors!

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It's time to enter to win! Engineering Excellence Awards entries due November 2

There are 13 opportunities to be a winner in ACEC of Tennessee's 2013 *Engineering Excellence Awards* (EEA) competition that will recognize engineering firms for projects that demonstrate a high degree of achievement, value, and ingenuity. There are 12 entry categories plus The Grand Iris Award that will be presented to the project judged best overall in the competition.

Submit entries by November 2 to take the first step toward winning an EEA award, receiving statewide recognition, and having the bragging rights that come with a prestigious EEA award. A Call for Entry postcard is inserted in this newsletter for ACEC members.

Questions? Need more information? Contact Judy Logue at 615-242-2486 or email jlogue@tnec.org. In addition, complete entry information is also posted online at <http://www.acectn.org/CallEntry.htm>.



CDM Smith won The Grand Iris Award, the highest honor in the 2012 EEA competition, for its project, John J. Duncan, Jr. Knoxville Station Transit Center. The Transit Center is owned by the City of Knoxville and operated by Knoxville Area Transit. Entries for the 2013 EEA competition must be submitted by November 2.

BIM advantages (continued from page 1)

- Toilet and sink drain lines passed through steel beams in many locations. Either the drain line was relocated or the steel beam was moved
- Underground pipes conflicted with concrete grade beams. The grade beams were either lowered, the pipes raised, or the pipes adjusted to fit within the middle third of the grade beam depth to avoid the longitudinal reinforcement.

- A braced frame in the powerhouse was found to conflict with a mechanical louver. The width of the tube brace was reduced and the exterior wall was pushed out.

Prior to release of the final construction documents, a fully coordinated model with no clashes was produced, which resulted in fewer Requests for Information (RFIs) during construction.

Advantage of coordination

Initially, the design team has to decide which items will be modeled and which will not. In the structural model, the main structural steel and foundations are included, but brick hangers, shelf angles, diagonal kickers, and other miscellaneous steel components are excluded. These items are included in the model prepared by the steel detailer during the shop drawing process.

The project had a fast track schedule in which the structural drawings were issued well before the rest of the design team completed their drawings. This required the other disciplines to be involved much earlier in the design. Conflicts discovered after the steel was in fabrication required the design team to make revisions that did not involve changing the structure.

Clash detection and coordination through 3D modeling and BIM yielded a successful project in Smyth County for the design team, contractor, and the owner.

This project is one example of why BIM has become an accepted practice that is transforming traditional project deliverable methods and shaping the future of the industry.

MEMBER NEWS

- Eddie Wade, PE, has joined Lamar Dunn & Associates to head the firm's Chattanooga office.
- Paula Harris, CPSM, has been promoted to executive vice president and elected corporate secretary and Kim Sumner Hardin, AIA, has been promoted to vice president and elected corporate treasurer at Barge, Waggoner, Sumner and Cannon, Inc. Randy Smith, PE, and Michael B. Vincent, NCARB, have joined the firm's Nashville office to work with the Industrial and Building Services group.
- Littlejohn Engineering Associates (LEA) has established an office in Knoxville, headed by Matt Williamson, PE.
- Patrick Neal, PE, has been named a principal owner of Pickering Firm. Neal has been associated with Pickering's Memphis transportation team for 16 years.

CALENDAR

SEPTEMBER 4

ACEC Membership Committee Meeting
10 a.m. EDT/9 a.m. CDT
Information:
dtharrell@vaughnsmelton.com

SEPTEMBER 12

ACEC Board Meeting
2:30 p.m., Embassy Suites, Murfreesboro

SEPTEMBER 13

ACEC Environment & Energy Committee
5 p.m. to 6 p.m.
Embassy Suites, Murfreesboro
Information:
aspann@ensafe.com

SEPTEMBER 13 - 14

ACEC of TN/TSPE/ ASCE Joint Annual Meeting
Embassy Suites, Murfreesboro
Information:
jlogue@tnec.org

SEPTEMBER 21

ACEC Business Practices Committee
10 a.m. EDT / 9 a.m. CDT
Information:
tverner@fisherarnold.com

OCTOBER 9

ACEC Nashville Chapter Board Meeting
7:30 a.m., Tennessee Engineering Center Board Room
Information:
bobmurphy@rpmtraffic.net

OCTOBER 14 - 17

ACEC Fall Conference
Boca Raton Resort & Club
Boca Raton, FL

NOVEMBER 2

Deadline to Submit Entries for *Engineering Excellence Awards*
Information:
jlogue@tnec.org



AMERICAN COUNCIL OF ENGINEERING COMPANIES
of Tennessee

Tennessee Engineering Center
800 Fort Negley Boulevard
Nashville, TN 37203

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Welcome, New Member

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cmcmurray@amtengineering.com

AMT, Inc. provides multidisciplinary services including engineering, environmental, landscape architecture, surveying and construction administration and inspection in the Eastern Region of the United States for a variety of public and private clients.

FROM THE EXECUTIVE DIRECTOR

Be part of September happenings!

by Candy Toler
Executive Director, ACEC of Tennessee

September is a happening month for ACEC of Tennessee. Registrations for the Annual Meeting and Professional Development Con-



Candy Toler

ference are approaching an all-time high; with the inclusion of TSPE and ASCE, we hope to draw over 300 people to the Embassy Suites Murfreesboro, September 13-14. The theme is *Partnering for the Future* and with four different education tracks, there will be something for everyone. You can register online at <http://acecascetspe.eventbrite.com/>.

You'll want to hear Tennessee Environment and Conservation Commissioner Bob Martineau on September 13 when he will be the keynote speaker at the Tennessee Engineering Foundation Luncheon, TEF's primary annual fundraiser. Get your ticket today by following the link for the meeting.

Speaking of happenings—it's election season. With the general election for Senators and Representatives at the state and national levels on the horizon, your ACEC PAC and Tennessee Professional Engineers' PAC need your support this month. Contribute to the state and national effort directly by writing checks, donating an item for the state PAC auction, and making a purchase at the auction. Please support legislative candidates who bring us to the table on issues, so that we are not on the menu!

This month is the kick off for the 2013 Engineering Excellence Awards. An entry postcard is enclosed with this newsletter for ACEC members. Want to see your firm spotlighted and praised? Take the first step now. Go to www.acectn.org and click on the EEA tab to learn more about the categories and requirements. The EEA committee has made an adjustment to the award program time frame so it will be easier for Tennessee winners to submit projects to national competition. Don't miss this opportunity to showcase your projects!