ENR
Engineering News-Record
November 15, 2010 ▪ enr.com The McGraw-Hill Companies

HOT-LINKED JOBSITES

Robust data circulation to and from sites speeds work, reduces waste and promotes project health

McGraw Hill CONSTRUCTION

FORECAST 2011
Stalled recovery revs back up

Volume 265 • Number 14

COVER STORY

Hot-Linked Jobsites

44 Software vendors and construction firm innovators are jumping on an exploding array of mobile devices and communication services to leverage job data.

Cover illustration by Harry Campbell; photo right by Tom Sawyer

NEWS

Oklahoma tower will reach 850 ft. Page 22

Buildings

22 **Urban Development:** Oklahoma City defies recession

Business

10 **Forecast 2011:** A stalled recovery ready to rev back up

15 **Equipment:** As fleets grow old and weary, purchasing rebounds

16 **Elections:** Mixed results for bond issues

UPCOMING ISSUES

Nov. 22 Licensing and Ethics
Nov. 29 Web News and Updates
Dec. 6 Nuclear Construction
Dec. 13 Global Sourcebook

49 **Workforce Solutions:** Women executives seek bigger role

Environment

18 **Nuclear Waste:** Stimulus funds accelerate decommissioning and demolition of former nuclear-weapons site

20 **Corruption:** The whistle-blower behind the Louis Berger settlement

21 **Investigations:** No fault assigned by oil-spill panel

Savannah River deconstruction. Page 18

DEPARTMENTS

4 Calendar
7 Construction Week
9 Washington Observer
24 Construction Economics
80 Products
81 People
83 Pulse
94 Official Proposals (cont. on p. 95)
96 Viewpoint

Please Recycle This Magazine

For subscriber services call:
(877) 876-8208 or (515) 237-3681

GO TO MY.ENR.COM FOR PASSWORD-PROTECTED ONLINE ACCESS.

Not getting ENR Insider and News Alerts? Please call (877) 876-8208

enr.com
ADDITIONAL CONTENT ONLINE

Engineering News-Record
The McGraw-Hill Companies
SERVING THE INDUSTRY SINCE 1874

ENR (Engineering News-Record), (ISSN 0891-9526). Published weekly 3 issues a month; 36 weeks a year by The McGraw-Hill Companies, 1221 Ave. of the Americas, New York, N.Y. 10020. **Founder:** James H. McGraw (1860-1948). **Executive, editorial, circulation, advertising offices:** Two Penn Plaza, New York, N.Y. 10121-2298. Phone (212) 512-2000. **Postmaster:** Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Harlan, IA 51593. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No.40012501. Registered for GST as The McGraw-Hill Companies. GST #R1230756 73. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DHL Global Mail, 355 Admiral Blvd-Unit 4, Mississauga, ON L5T 2N1. Email: enrcustserv@cdsfulfillment.com. **Copyright, printing and reprinting:** Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. ® in U.S. Patent Office. Copyright © 2010 by The McGraw-Hill Companies. All rights reserved. **Officers of The McGraw-Hill Companies, Inc.:** Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Robert J. Bahash, Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and General Counsel. McGraw-Hill Construction: Keith Fox, President; John Murphy, Director, Finance. Where necessary, permission is granted by copyright owner for those registered with Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, www.copyright.com, to photocopy any article herein for personal or internal reference use only for the flat fee of $1.20 per copy for each article. ENR Construction Economics, Top Rankings and Sourcebooks available for a fee in downloadable PDF format at www.ENR.com. Send payment to CCC. ISSN 0891-9526/92. Copying for other than personal or internal reference use without express permission of The McGraw-Hill Companies is prohibited. Write the editor to request such permission. **Printed in the USA. Subscription rates for individuals in the field of the publication:** U.S. and possessions, $82 per year (single copies $8.95 in U.S.); Canada and Mexico, $89 per year; outside North America, $195 per year. Please allow four to six weeks for shipment. **Subscriber service and single copies:** (877) 876-8208 or (515) 237-3681. Send all correspondence, notices and subscription orders to Fulfillment Manager, ENR, P.O. Box 5730, Harlan, IA 51593. If possible, attach address label from a recent issue. **Please contact customer service to change your name or address.** If the postal authorities alert us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Please allow a month for change of address to take effect. Classified advertising: Send ads to ENR, Classified Advertising, Two Penn Plaza, 9th Floor, New York, NY 10121. Phone (212) 904-2815.

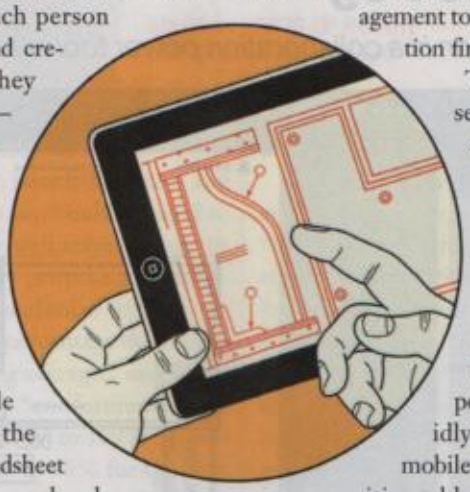
PHOTO LEFT COURTESY OF DEVON BLDG DEC. PHOTO CENTER COURTESY OF SRNL

Hot-Linked Sites Bring Data Home

Innovators leverage the advances in mobile devices, wireless connections, software and services to bridge the 'last mile' in electronic data exchange: the path from job trailer to the workface

By Tom Sawyer

Picture this site in San Antonio: The project manager and supervising engineers are finishing a 16-story, 285-unit Embassy Suites Hotel, and they are huddled around an assortment of Windows tablets, iPhones and iPads. They all go online and open folders on their screens linked to a cloud-based shared file. They open a plan of the hotel's 14th floor. Each person zooms in on separate rooms and creates their own punch list. They flag issues by dragging icons—coded by issue and trade—to the plan, from pallets on screen. Sometimes they hand-write notes and attach them.



At any time the users can see the icons their colleagues are placing while working elsewhere because the shared file synchronizes as they work. At the bottom of their screens, a spreadsheet translates the icons into data, turns handwritten notes into type and builds an Excel report for generating notifications to the subs. They will get an e-mail with the spreadsheet and the plan identifying issue locations. By the time the inspectors break for lunch, they are done.

"It's a patchwork of stuff, but it's incredibly effective," says Bill Roberts, a project executive with the contractor, Zachry Construction Corp., San Antonio. That set of innovations, stitched together by technologists at Zachry, links disparate software, wireless services and mobile devices into a system that pumps data from jobsite to the office and back again. But as exciting as it is, Zachry's 123 Punch List project is just one of many examples of creative field data management tools emerging among construction firms today.

There is a tide of tools and services washing into the construction industry, and it is coming at many levels of sophistication, from cobbled together to comprehensive offerings, as firms and vendors experiment with a torrent of new hardware, software and cloud-computing possibilities. Moreover, the rapidly expanding universe of smart mobile devices—touch- and pen-sensitive tablets, iPhones, iPads, Androids and wireless broadband services—is pouring gasoline on the creative fires.

RELATED VIDEO
You can see Zachry's 123 Punch List and other tools in action on ENR.com.

Many supervisors say field data management tools already have revolutionized operations. Others say, hold onto your hats: The revolution has just begun.

On Sept. 29, in Boston, 75 senior executives, field practitioners, information technologists and virtual

SOLUTIONS

At Sky Harbor International Airport in Phoenix, staff technologists have developed Fieldport, a mobile product to create and process work orders. It is paired with the airport's geographic information and SAP systems to create work orders in real time, with detailed GIS location information attached.

design and construction experts, representing 40 companies, met for a two-day customer advisory conference with field data management vendor Vela Systems Inc., Burlington, Mass. Five-year-old Vela partners with hardware vendor Motion Computing Inc., Austin, Texas, to supply mobile data systems to its clients, offering a suite of field data collection, issue tracking, punch-list tools, document management and integration services for construction.

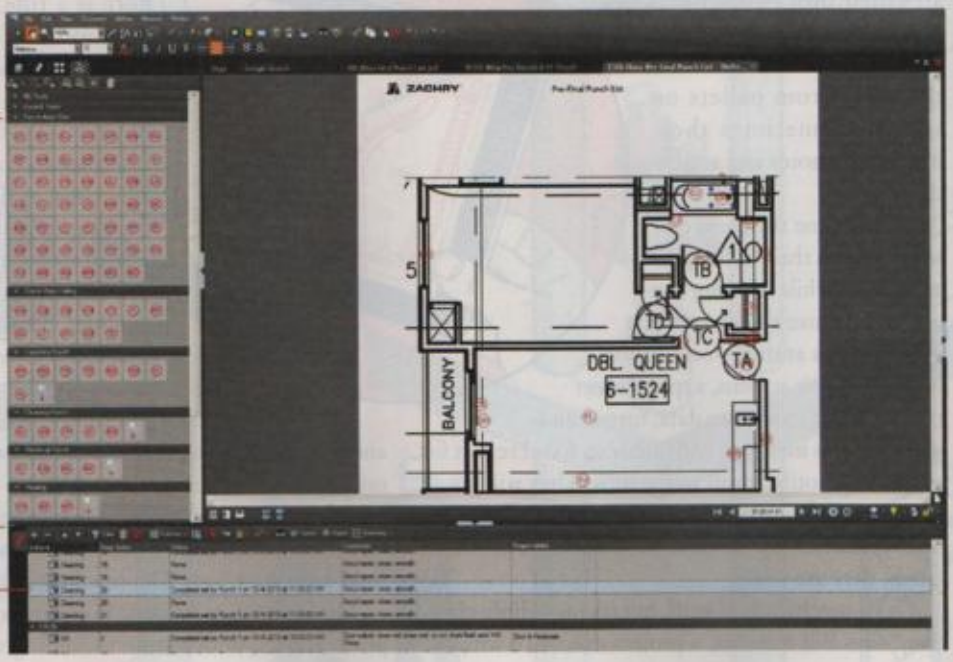
The users were there to share successes and frustrations and to challenge the vendor to help them do more. Many said they want to integrate field-collected data into databases attached to building information models so it can be analyzed to improve efficiency. Further, users want to send feedback to designers to improve collaboration and create added value by gathering as-built data for facility management at the end of construction.

The Vela team says it is ready. "Vela reports have been accumulating for five years now," says Todd Huntington, CFO. He says three million issues have been managed through the system, creating a trove of data across years of projects that should be a gold mine for companies "to improve decision-making."

Punching Through the Fog

Bluebeam PDF Revu's punch-list function is a collaboration power tool in cloud-sharing scheme

Inspectors using Zachry's 123 Punch List field-data collection system and Bluebeam PDF Revu to collaborate have pallets of issue icons, coded for common notations, by trade, which they can drag and drop onto a PDF of the floor plan in a shared folder. Preferences are set for frequent saving and refreshing over the Internet, so each inspector's changes show up immediately. A function at the bottom of the screen translates icons into a spreadsheet for creating notifications.



Gadgets Are Hot and More Are at Hand

The iPhone "is almost contagious," says Todd Sutton, project controls manager at Zachry Construction Corp. "One person gets it on the jobsite, and then everyone has them." A new MoGo Talk XD case (top left), which comes with a built-in headset keeper, makes them even sweeter. Infectious adoption also applies to the iPad (top right), Sutton says. Employees see how much work colleagues get done with them and buy their own. Developers at Motion Computing, whose tablet options (lower right) include bar-code and RFID readers, say the Apple device popularity is good for tablet computing, because it introduces more people to the form, and many will go on to more powerful machines. In the wings is Golden-i, a heads-up-display and voice-activated, remote-access computer controller (lower left) from Kopin Corp., is expected to hit the market soon.

iPHONE WITH MoGo TALK XD CASE

APPLE iPAD

GOLDEN-i HEADS-UP REMOTE CONTROLLER AND DISPLAY

MOTION COMPUTING F5v

The Vela executives suggest that firms use their data to analyze delays, RFIs, punch-list items and rework. This data, the execs say, could be used to quantify conformance—how well teams adhere to plans and expectations. They propose a "conformance index" for contractors and subs.

"Conformance equals the percentage done right the first time. It's like a batting average," says Huntington. Vela's data, across a "conformance peer group," suggests a system with 97 to 100% conformance for top performers, 90 to 96% for the next level, and 89% or less for those "who need help."

Huntington says the growing ability to gather and manage performance data at the construction site gives the industry a tool to measure and improve. "This is real progress, when you can analyze your own performance and compare it to your peers'," Huntington claims. "What gets watched, gets done. What you care about, gets done—and that leads to an amazing concept: Do it right the first time."

Vela user Steve Braverman, a project executive, at Rosendin Electric Inc., San Jose, Calif., agrees, "We only get paid to put it in once." Gary Armstrong, vice president of Southeast construction operations for Suffolk Construction Co., Boston, added, "You have to convince your team to take ownership of quality, and then they start being proactive problem solvers." By gathering field data on all performance—not focusing on errors and exceptions as traditional quality assurances tends to do—managers also can see what's working well and incentivize employees and subs to excel.

Emerging Tools

The tools to get on with mobilizing project data are developing exponentially, and firms aren't waiting for their biggest jobs to try them, although many count on internal champions to guide the way. Todd Sutton,

COVER STORY
MOBILIZING PROJECT DATA

SEE LINKS ONLINE
Related links on ENR.com will connect you to other cool apps for construction.

If All Else Fails, Satellite Modems Punch Through

When companies take work to the ends of the earth, communication reliability goes out the window, especially in areas struck by wars or disasters. For professionals determined to maintain contact, whatever the conditions, satellite data terminals are the ultimate backup plan.

On a recent reporting trip to Haiti, I packed a BGAN Explorer 500 Satellite Data Terminal from Inmarsat. It was on loan to ENR so I could test it for business continuity. GIT Satellite Communications, Austin, Texas, provided support. My intent was to maintain connectivity, whatever the conditions, just as firms deploying for reconstruction in Haiti—or anywhere else—might need to do.

PHONE HOME BGAN data terminals, which support voice calls as well as data, love a good view, like the sky to the southeast of Haiti.

ENR editors have used earlier models of Inmarsat terminals from Europe, Iraq and Afghanistan and have found them great for e-mail, sending attached files and web-browsing. But the intent in Haiti was to maintain more intensive processes, such as checking page layouts in and out of a server and posting-high resolution video.

The BGAN has an on-board battery that can run for a few hours of heavy use, but I also took an Xpal rechargeable Energizer power pack with multiple outputs. Generally, in Haiti, I was able to get 110-volt AC power and sometimes even Internet service. But blackouts and unpredictable generators often shut me down. Then the BGAN went to work.

The 3.1-lb terminal needs a view of the satellite, but it also shoots through foliage, tents and the fiberglass tops of HUMVEEs. Software loaded in advance, an on-board compass, tilt vernier and GPS, help set altitude and azimuth for one of the three Inmarsat geo-stationary satellites that cover nearly the entire earth. Alternately, users can aim by listening to a beep that starts when the modem is pointed in the general direction of a satellite. Rotating the unit and moving the folding leg under the back adjusts the aim. The beeps get faster as you zero in, becoming a solid tone with a hit.

In Haiti, e-mail and browsers worked well, but operations with lots of overhead or ones requiring "handshakes," struggled or timed out.

Gurudain Chana, an Inmarsat technologist in London, later explained that heavy traffic from the region was a problem. Also, while the maximum bandwidth is 492 kbps, signal latency is "a lot longer" via satellite, and it adds up, leading to time-outs. Software overhead on some VPN products use as much as 85% of available bandwidth, with some FTP products being nearly as bad, slowing uploads to a crawl. Chana says getting software vendors to reveal overhead is almost impossible, but by testing and timing transmission of the same packet through different systems you can find the best alternatives. Up-front planning of all usage strategy is important, Inmarsat suggests, before attempting to communicate from far afield.

By Tom Sawyer

COVER STORY
MOBILIZING PROJECT DATA

the business unit manager for project controls at Zachry who created the 123 Punch List system, says his company also uses packaged systems like Vela's, just not on every job. He now is helping set up Vela for a $600-million, three-way joint-venture project, in which he expects more than 100 users.

Sutton also is a master innovator. In IT circles he is known for creative assemblies of systems out of grab bags of inexpensive technology. "We have a lot of pieces, but it takes somebody creative to put it all together and make it work," acknowledges Zachry's Roberts. Sutton's 123 Punch List is a prime example. It is built with Dropbox, a free, online file-sharing service, as the hub, and a Windows-based PDF markup tool called Bluebeam PDF Revu ($119 each for 10 seats) as the data management tool. The team also carries one portable Clear Spot 4G router to provide Internet access for an assortment of hardware. But because Bluebeam's product does not run on Apple devices like the iPhones and iPads used by some on the field team, Sutton also uses a "magical" remote access app called iTeleport ($24.99) to tunnel to PCs, which run Bluebeam, back in the office.

LAST MILE Todd Sutton (left) with colleague and project-controls representative Jessie Kassinger evaluate a new iPod screen in hard light. Sutton says a convergence of better hardware, software and cloud services opens up a world of potential for project controls and efficiency gains through field data management.

With iTeleport on the iPad, the user's Bluebeam seat shows up as if it is running in native mode. With preferences set for aggressive synchronization, all users can see each other's changes immediately.

"The amount of usage we are getting from Bluebeam plus Dropbox are an unexpected benefit," says Zachry project manager Jorge L. Valle. "It is the last mile linkage that makes it all work." ■