

# Sweeping the Nation

## Bowen's Indianapolis airport project earns pair of major awards

**H**aving a construction project win a national award is something most contractors can only dream about. However, for one ICA member, the dream became a reality not just once, but twice for the same project.

Bowen Engineering Corporation not only garnered a prestigious Aon Build America Award from AGC of America for its Central Energy Plant Indianapolis Maintenance Center Utility Connector, but also saw the project recognized as the Project of the Year for a new installation by trade publication *Trenchless Technology*. As the tunneling subcontractor, Midwest Mole, Inc., also an ICA member, had a major role in the recognition gained

for this project. Other members participating as subcontractors included Barth Electric Company, Inc., The Hoosier Company, Inc. and Harmon Steel, Inc.

Bowen took home one of 17 Aon Build America Awards presented earlier this year during the AGC Convention. The Indiana firm captured the top prize in the Municipal & Utilities-New category. "The Aon Build America Awards recognize the nation's premier projects, large and small, from across the country," said AGC CEO Stephen E. Sandherr. "The Build America Award winners embody the industry at its best and truly illustrate how AGC contractors are building America's quality of life."

The Bowen project was part of the construction of the new Midfield Terminal at the Indianapolis International Airport. The project provides an inter-connect of thermal and electrical utilities from the existing Central Energy Plant to the new terminal. Bowen's involvement with the project started during the later stages of design, when it became apparent the initial design would result in costs more than double the airport's budget and delay delivery of the utilities to the new terminal by two years.

In September 2005, Bowen Engineering collaborated with the operator of the plant to provide an alternate construction proposal. The design changes proposed by Bowen



A worker performs closure welding on the 8-inch High Temperature Hot Water outer conduit.



Operation Noodle in play as field fabricated 1000-foot runs of pipe are cribbed up and ready to pull into the tunnel.



Work proceeds at some of the pipe connections.

cut the original design estimate of \$48 million to a project target price of \$28 million. An additional savings of \$4 million were realized during construction through excellent project management, teamwork, production management and attention to detail.

This included \$1 million that Bowen realized as a shared savings bonus.

Redesign of the tunnel by the Bowen Engineering construction team was one of the key steps in reducing project costs. The original design utilized 132-inch inside diameter pre-cast concrete

tunnel segments that created the need for a tunnel bore machine that was not readily available. The Bowen redesign reduced the tunnel to a 102-inch outside diameter with steel liner plates. While the original design was for an occupied tunnel to allow maintenance



Company founder Bob Bowen and Bowen Engineering Project Manager Bill Fyffe look over a section of tunnel steel liner plate constructed for a "tunnel mock up."



**DO YOU HAVE** a project that could qualify for a 2009 Build America Award? If so, you'll need to submit your entry to AGC of America by the Nov. 6, 2008 deadline. The competition is open to all AGC contractor members working as prime contractors for projects completed between December 2007 and October 2008. All parties of a joint venture must be AGC-member firms and dues-paying members of the local AGC chapter in the area of the project.

Awards are presented for new construction and renovation work in the following categories:

- Building construction
- Federal & heavy construction
- Construction management
- Design-Build
- Environmental
- Highway and transportation construction
- Municipal and utilities construction
- International

Small and large projects are considered equally. Sophistication of the presentation is not part of the judging but completeness in addressing all of the following criteria is essential:

- meeting the challenge of a difficult job
- excellence in project management
- innovation in construction techniques or materials
- contractor's state-of-the-art advancement
- sensitivity to the environment and surroundings
- excellence in client service
- contribution to the community

The Aon Build America Award winners are often determined by the uniqueness of a project. Further details are available from ICA or the AGC Web site at [www.agc.org/awards](http://www.agc.org/awards). The 2009 awards will be presented during the 90th annual AGC of America Convention, March 4-7, 2009 in San Diego.

of the utilities, the finished product incorporated anchoring of the hot water lines at the center of the tunnel and grout filling the tunnel interior. This forced all thermal expansion to occur in the structures at the end of the tunnel and allowed the use of a more reliable ball-joint expansion system.

Construction of the project also involved challenges and innovations. One of the biggest challenges was the work performed by Midwest Mole in tunneling under an active runway and taxiways. The 2,100-foot long, 102-inch diameter cut through glacial till, water-bearing sands and gravels and boulders was accomplished with a 207,000-pound Akkerman model EPBM 108 EPB TBM.

Once the tunnel had been drilled and the plates installed, Bowen used further innovation to install the tunnel piping. This was accomplished by field fabricating the pipe in 1,000-foot sections. The Bowen team borrowed a concept from the house-moving industry to move the 1,000-foot segments into place. Multiple conveying techniques were used at the same time to move pipe segments that weighed in excess of 180 tons. The procedure – known as Operation Noodle – required trailer axles, pipe roller cradles, roller hangers, pipe skates, a 15-ton mechanical pipe tugger, two Cat 330 excavators and 15 workers.



Operation Noodle is complete as the pipes have been placed through the tunnel.

The tugger, powered by an air compressor providing more than 22,000 pounds of force, pulled the pipe through the tunnel at about 20 feet per minute. The tugger was attached to the end of the pipe with a steel cable. This technique reduced construction time by allowing pipe fabrication to occur simultaneously with the tunnel boring. Costs were also saved by allowing the workers to weld and connect the pipe in an open field rather than inside the 102-inch tunnel. This also ensured safety of workers and aided with inspection to ensure the quality of the pipe welding and pressure testing.

The project also involved installation of more than two miles of pipe using conventional excavation methods. This included eight-inch high-temperature hot water supply and 24-inch chilled

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**ICA MEMBERS HAVE EARNED RECOGNITION** for more than just the projects they build or their safety efforts. One member recently gained recognition for entrepreneurial innovation.

**Midwest Mole, Inc.** was one of five companies to receive Innovation Awards for 2007 from the Indiana University Kelley School of Business for the school's Indiana Entrepreneurial Awards of Distinction. Midwest Mole was the lone ICA member to qualify as a finalist for any of the awards in three categories. The Innovation Award category recognizes companies that pioneered new systems, products or best practices to adapt to changing business conditions.

To be eligible, companies had to be founded by 2004, be a public or private corporation located in Indiana and have revenues of more than \$1 million. Joe Butor, a project manager for Midwest Mole, said the company works through each project challenge with appropriate experts and keeps up on innovations from trade magazines and industry contacts.



**EXCELLENCE IN SAFETY** has earned recognition for some ICA members. **Milestone Contractors, L.P.** was honored earlier this year with the National Asphalt Pavement Association's 2007 Asphalt Operations Safety Innovations Award. The award recognizes companies that develop innovative ideas or achieve practical outcomes leading to improved worker safety in a roadway, plant site or quarry environment, and whose safety practices go beyond normal safety practices.

Milestone won the award for its Certified Safety Supervisor initiative. To earn the certification, supervisors and managers must complete special training, evaluate past safety incidents and complete one season free of any personal injury or property damage incidents. The Certified Safety Supervisor program gives employees control over the safety of their work environment, said Amy Haschel, quality coordinator. Since developing the program in 2006, Milestone has seen its safety record improve, with a significant decrease in the severity of incidents.

Three ICA members were also among the award winners in the annual safety competition sponsored by the Metro Indianapolis Coalition for Construction Safety (MICCS). This included **Bowen Engineering Corporation's** winning of the top prize – the Excellence in Safety Crystal Eagle Award – for the second straight year. Bowen was also best in the General Contractor above 300,000 man-hours category. Implementation of a "know your tool" training program was a factor in Bowen's success. This program allows for cross training on tools so there are always at least two people on a project that know how to safely handle a specific tool.

Other ICA winning members were **Shambaugh & Son, LP** as best in the Mechanical Contractor category and **Scaffold King Rentals, Inc.**, which earned a Zero Injury Award.

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water supply and return. Another 2,500 linear feet of the piping system connected the Central Energy Plant to the direct bury portion of the work. This work was installed on the top of an existing pipe arbor at a working height of 40 feet above grade. In all, the utility lines form a closed loop system of 20,000 linear feet of underground piping.

The work also included three concrete cast-in-place structures at depths in excess of 45 feet below grade. One aspect of the hot water pipe that called for extra planning is that when the pipe is filled with 325-degree water, it expands in length by about four feet. Highly-critical ball joints at both ends of these structures accommodate the pipe's movement.

The 2,100-foot tunnel bored by Midwest Mole was 22 feet below an active runway and taxiways and took six months to complete. Because of the risk to aircraft, the contract set a settlement limitation of one-half of an

inch. Joe Butor, Midwest Mole's project manager, said several techniques were used to assure that this tolerance was achieved. One was the use of an earth pressure balance type of tunneling machine that equalized the water pressure in the ground while cutting through the earth. This was done by appropriate advance rates and by injecting soil conditioners at the cutting face. The soil conditioners transformed the cut earth materials to a paste-like substance. The maximum measurable settlement recorded was less than 0.07 inches. The success of this operation was of no small interest to Bowen, who faced damages of \$1 million per day if airport operations had been interrupted.

As the tunnel bore machine advanced, an erector arm specially developed by Akkerman, the tunnel bore machine manufacturer, rotated the 5/16-inch thick gasketed steel liner plates into position to keep unsupported ground to a minimum. The arm

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allowed the plates to be rotated into position. The annular space between the plates and the tunnel walls was continuously grouted by Midwest Mole to also assure minimal settlement.

Once the tunnel was completed and the pipes installed, Midwest Mole grouted the remaining space with 3,000 cubic yards of a two-component grout mix that had to be pumped 2,000 feet. According to Butor, the material began to set up immediately once the two components were mixed.

Pre-planning was a key ingredient in the success of the project according to Butor. "Once you start in the ground, there is no turning back." From his perspective, the teamwork involved in the project was also "huge" in meeting the project's challenges.

As noted by AGC's Sandherr, this is another example of AGC contractors improving the quality of life; this time at the largest airport in Indiana.

### **TWO ICA MEMBERS**

recently earned awards from the National Asphalt Pavement Association for their websites. **J. H. Rudolph & Co., Inc.**, Evansville, was the top winner in the HMA Producer Member division for its site – [www.jhrudolph.com](http://www.jhrudolph.com) – that is targeted to customers, employees and the public. The site showcases the company's work through past and present projects and offers information on the safety and quality of the hot-mix asphalt industry. The award recognizes website designs that promote the use of hot-mix asphalt and the HMA industry.

A finalist in the same category was **Milestone Contractors, L.P.**, Indianapolis, for its site – [www.milestonelp.com](http://www.milestonelp.com). The site has a two-fold purpose. It provides an overview of the company's capabilities and services for others involved in the construction industry. The site is also used for recruiting potential employees.

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