



## Nominations for the 2003 NOVA Awards

By Raabal W. El-Amin<sup>1</sup>, Christine K. Miller<sup>2</sup>, Rasha M. Stino<sup>3</sup>,  
Ihab A. Ismail<sup>4</sup>, Suzanne Kohrs<sup>5</sup>, and Robert I. Carr<sup>6</sup>

**Abstract:** This paper presents summaries of the 35 NOVA Award Nominations received between October 15, 2001 and October 15, 2002 for the 2003 NOVA Awards presented April 24, 2003 by the Construction Innovation Forum (CIF) at its annual NOVA Awards Banquet. Nominations include innovations in concrete, steel, foundation, utility, highway, rehabilitation, masonry, asphalt, composites, plastics, piping, bridge, underground, and temporary construction. Nominations also include innovations in architecture and engineering; automated measuring and positioning; project management; automation; internet applications, e-construction; information systems; equipment; green construction, environmental control; remote sensing and mapping; and worker training and safety.

### INTRODUCTION

This paper presents summaries of the 35 NOVA Award Nominations received between October 15, 2001 and October 15, 2002 for the 2003 NOVA Awards presented April 24, 2003 by the Construction Innovation Forum (CIF) at its annual NOVA Awards Banquet. Nominations include innovations in concrete, steel, foundation, utility, highway, rehabilitation, masonry, asphalt, composites, plastics, piping, bridge, underground, and temporary construction. Nominations also include innovations in architecture and engineering; automated measuring and positioning; project management; automation; internet applications, e-construction; information systems; equipment; green construction, environmental control; remote sensing and mapping; and worker training and safety.

Nominations are numbered in the order they were postmarked. Readers can access the individual nominations to obtain more detailed information at [www.CIF.org](http://www.CIF.org).

#### 1 MORTARLESS MASONRY WALL SYSTEM ERECTS FASTER CONCRETE BLOCK WALLS

Flexlock Mortarless Masonry Wall System is an innovation that addresses the masonry industry's shortage of masons in the United States, and need for increased productivity. Flexlock has an interlocking design, precision bearing surfaces, and post tension tendons, which bring technical and economic competitive advantages. Flexlock serves residential, commercial, and industrial construction in numerous applications including such load-bearing applications as residential foundations and such non-load bearing applications as sound walls and fencing. It reduces time and overall construction cost, and it is reusable, which give it competitive advantages over traditional masonry wall systems. Contact: Dominic Cerrato; Cercorp Initiatives; 201 Luray Dr.; Winterville, OH 43963, 740-346-0960; Fax 740-346-0961; [www.cercorp.com](http://www.cercorp.com).

#### 2 PAVEMENT QUALITY INDICATOR MEASURES ASPHALT PAVEMENT DENSITY

TransTech Systems' Pavement Quality Indicator (PQI) makes instantaneous, in-situ measurement of field pavement density. This contrasts with the traditional destructive and time consuming methods of measuring asphalt pavement density and the strict licensing requirements associated with the use of the nuclear densitometer. PQI was developed by TransTech Systems in 1995 under the New York State Energy Research and Development Authority Agreement. It makes innovative use of a constant voltage, low frequency, electrical impedance approach that measures compaction level or density by measuring the change of the electrical impedance of the material matrix through the use of a flat sensing plate. The accurate, immediate in-situ field measurements help achieve better quality and longer service life pavements. NOVA Award Finalist. Contact: TransTech Systems, Inc.; 1594 State St. Schenectady, NY 12304 518-370-5558; Fax 518-370-5538; [dapkarian@transtechsys.com](mailto:dapkarian@transtechsys.com); [www.transtechsys.com](http://www.transtechsys.com).

---

© Construction Innovation Forum, 2003, 43636 Woodward Avenue, Suite 300; Bloomfield Hills, Michigan, U.S.A. 48302; 248-409-1500; Fax: 248-409-1503; E-Mail: [info@cif.org](mailto:info@cif.org); Website [www.CIF.org](http://www.CIF.org). The CIF freely permits and encourages downloading from [www.CIF.org](http://www.CIF.org), copying, and distributing this paper by anyone.

The CIF and the authors do not endorse the innovations, they do not represent that the innovations perform as described, and they neither accept nor reject claims made in the Nominations or the descriptions contained herein. The CIF prohibits use of these descriptions or references to these descriptions, or any part thereof, in any way that implies endorsement or acceptance of performance or claims.

<sup>1</sup> Master of Engineering student, University of Michigan, Ann Arbor, MI 48109-2125, [raabalwe@umich.edu](mailto:raabalwe@umich.edu)

<sup>2</sup> Ph.D. Candidate, University of Michigan, Ann Arbor, MI 48109-2125, [ckm@umich.edu](mailto:ckm@umich.edu)

<sup>3</sup> Project Engineer, Sites International, Cairo, Egypt, [stino@umich.edu](mailto:stino@umich.edu)

<sup>4</sup> Manager of Engineering, Turner Construction Company, 535 Griswold Street, Suite 200, Detroit, Michigan 48226, 313-596-0512, [iis@mail@tcco.com](mailto:iis@mail@tcco.com).

<sup>5</sup> Project Engineer, Barton Malow Company, 26500 American Drive, Southfield, MI 48034, 248-436-5000, [suzanne.kohrs@bartonmalow.com](mailto:suzanne.kohrs@bartonmalow.com)

<sup>6</sup> Professor of Civil Engineering; Vice-Chair, CIF; Senior Chair, NOVA Awards. Department of Civil and Environmental Engineering; University of Michigan; 2340 G.G. Brown; Ann Arbor, MI 48109-2125; 734-665-8287; Fax 734-665-1737; [RICarr@umich.edu](mailto:RICarr@umich.edu), [www.RICarr.com](http://www.RICarr.com).

**3 AIR QUALITY MONITORING SYSTEM COLLECTS CONTAMINANTS THROUGH DIFFUSION**

OSHA standard 29 CFR 1910.1000 requires employers to monitor and use engineering or administrative controls to bring employee exposure to airborne contaminants to permissible levels. 3M Air Monitoring devices help fulfill that requirement. The devices collect contaminants through the scientific principle of diffusion and provide workplace environmental contaminant data that can be used to protect workers. However, the sampling is limited to certain vapors and gases, and not particles. The simplicity, the small size, the light weight, and the analysis options of the 3M Air Monitoring device makes it attractive for construction employers working in chemical plants or facilities where construction workers may be exposed to a contaminated air environment. Contact: Eric Johnson; 3M Corporation; 3M Center Building; 235-2E-91; St. Paul MN; 55144-1000 651-575-5573; Fax 651-736-7344; [www.3m.com/occsafety](http://www.3m.com/occsafety).

**4 FIBER REINFORCED POLYMER (FRP) REINFORCING BAR IS ALTERNATIVE TO STEEL REINFORCING**

Fiber Reinforced Polymer (FRP) reinforcing bars, first invented in 1960's, have high strength to weight ratio, electric or magnetic transparency, and corrosion resistance that fit a wide scale of construction applications. This is especially true with the last five years' advances in production techniques and implementations of design guidelines. FRP bars reinforce new structures in areas where steel reinforcing bars have limited life due to corrosion, and strengthen existing concrete, masonry, and wood members. This ultimately extends infrastructures' service lives. This innovation is used on many projects, including the Innovated Bridge Research Projects funded by the Federal Highway Administration and a number of marine structure projects. Contact: Doug Gremel; Hughes Brothers, Inc.; 210 N. 13<sup>th</sup> Street; Seward, NE 68434; 402-646-6211; Fax 402-643-2149; [doug@hughesbros.aom](mailto:doug@hughesbros.aom); [www.hughes.com](http://www.hughes.com).

**5 ON-LINE BIDDING EXCHANGE FACILITATES THE BIDDING PROCESS BETWEEN AGENCY AND BIDDER**

Bid Express is the first fully electronic, internet-based bidding service, created in 1997 by BidX.com, a subsidiary of Info Tech, Inc. It was first implemented by the Wisconsin DOT. It handled \$4 billion in contracts in 2001. The website changed the way DOT agencies conduct their business with contractors by eliminating paper work. New projects are posted on the website, which provides quick access to bidding documents by a larger group of bidders that has increased competition. Bid Express has advantages to traditional bidding, given the lack of availability of early subcontractor bid quotes, the pressure of time and personal commitment, and the need to withdraw and resubmit bids before closing time. Contact: Thomas P. Rothrock, Ph.D.; Info Tech, Inc.; 5700 SW 34<sup>th</sup> St., Suite 1235; Gainesville, FL 32608-5371; 352-381-4400; Fax 352-381-4444; [tom.rothrock@infotechfl.com](mailto:tom.rothrock@infotechfl.com); [www.infotechfl.com](http://www.infotechfl.com).

**6 AERIAL CONCRETE WALL SAWING AND DRILLING MACHINE HAS INTEGRATED HYDRAULICS AND WATER**

SkySaw is a wall sawing tool for pre-cast and built-up concrete construction that is designed to improve productivity, lower maintenance and fuel cost, and reduce operator fatigue. It is a hydraulic powered saw with self-contained hydraulic and water tanks. A steel track is first attached to the concrete wall, and the SkySaw traverses the track and cuts the concrete wall. A raised work platform or scaffold for the operator to stand on is erected if the desired wall opening is higher than the operator's reach from the floor. Contact: Brian M. Boeckman; JLG Industries, Inc.; 13224 Fountainhead Plaza; Hagerstown, MD 21742; 240-420-8765; Fax 240-420-8733; [bmbocckman@jlg.com](mailto:bmbocckman@jlg.com); [www.jlg.com](http://www.jlg.com).

**7 GAS MAIN INSPECTION SYSTEM IS BASED ON MAGNETIC FLUX LEAKAGE (MLF)**

The Magnetic Flux Leakage Inspection System is a patented system for corrosion inspection of low-pressure gas distribution pipes. Inspection requires access at only one excavation site to insert a mechanically driven push-rod for moving the sensor through the gas mains while gas is flows through the pipe. The system has been evaluated in several locations in the US and Europe. Test results documented both internal and external pipe corrosion detection capability, accuracy of defect locations, and entering gas mains from one location and propelling to the distance of 1000' with gas flowing through the main and without interrupting gas flow. Contact: Kiran M. Kothari; Gas Technology Institute; 1700 S. Mount Prospect Rd.; Des Plaines, IL 60018; 847-768-0893; Fax 847-768-0501; [kiran.kothari@gastechnology.org](mailto:kiran.kothari@gastechnology.org); [www.gastechnology.com](http://www.gastechnology.com).

**8 DENSE POLYETHYLENE SLAB BLOCKOUT IS LEFT IN PLACE, WHICH SAVES WRECKING-OUT TIME**

Pocket Form Isolator (PFI) is a 'leave-in-the-slab' isolation pocket, a diamond-shaped block-out engineered of high-density polyethylene (HDPE). PFI can be left in the slab after the slab is poured. PFI is highly flexible and can be assembled around pre-set columns to allow monolithic pours. It is also easily penetrated with hand tools to accept conduit. PFI is best suited for the separation and expansion joint between inner and outer concrete pours. This eliminates the need for grout, fiberboard, and other separation methods. A contractor-performed time/cost study of PFI showed significant savings on 100 block-out jobs. PFI has been successfully used in many commercial and industrial structures including Target, Wal-Mart, Sam's Club, and Home Depot stores. Contact: Ray Hammond; Forrester Manufacturing Co., Inc.; 5073 Bristol Industrial Way; Buford GA 30518; 770-932-8849; Fax 770-932-6259; [rayhammond@isolationpocket.com](mailto:rayhammond@isolationpocket.com); [www.isolationpocket.com](http://www.isolationpocket.com).

**9 INTERNET PLAN ROOM INFORMATION NETWORK PROVIDES REAL-TIME INFORMATION TO CLIENTS**

Internet Planroom Information Network (IPIN) is internet reporting computer software that has revolutionized construction information reporting. IPIN was created by a group of eight Builders Exchange executives in Cleveland, Ohio, in 1997. A hundred thousand companies and over thirty-five construction reporting agencies throughout the United States and Canada use IPIN, which has eliminated the need of hard copy reporting and has provided access to thousands of construction

projects. Owners and general contractors can use the on-line programs to post new projects and provide quick access to bidding and contract documents, which reduces allowed bidding time and increases competition. This drives down the cost of construction to end users. Contact: Gregg Mazurek; The Builders Exchange, Inc.; 981 Keynote Circle, Suite 1, Cleveland, OH 44131-1800; 216-661-8300; Fax 216-661-8304; gmazurek@bxohio.com.

#### **10 JOINT OPERATOR & IRONWORKER TRAINING FOR STRUCTURAL STEEL ERECTION**

In the Raising Gang project ironworkers and crane operators receive joint training to learn to work as a team to master steel frame construction. It is a 40-hour week hands-on training program using a 150-ton complex training frame, preceded by eight hours of classroom instruction. In the past, ironworkers trained by erecting a small frame of lightweight steel members. Crane operators trained by lifting some structural steel, but they could not erect it into a structure. Now, iron workers and crane operators can train together to work together. The Raising Gang allows both trades to collaborate and combine efforts to improve safety and productivity. Contact: D. James Walker; Great Lakes Fabricators & Erectors; 1001 Woodward Ave, Suite 1101, Detroit, MI 48226; 313-309-2000; Fax 313-309-2004; execdir@glfea.org; www.glfea.org.

#### **11 BEHAVIOR BASED SAFETY AUGMENTS TRADITIONAL CONSTRUCTION SAFETY PROGRAMS**

BAPP technology is a process approach to reducing exposure to injury by helping organizations identify safety-related behaviors, gather data, provide ongoing two-way feed-back, and remove barriers to improvement. BAAP technology improves the working interface between the worker and the system and conditions. Behavioral Science Technology, Inc. first pioneered BAAP in the late 1970s for use in the manufacturing and petrochemical fields. Since that time the technology has since been implemented at over 1450 sites located in 39 countries. The approach has been implemented on multiple construction projects and companies. Contact: R. Scott Stricoff; Behavioral Science Technology, Inc.; 417 Bryant Circle; Ojai, CA 93023; 805-646-4595; Fax 805-646-0328; scott.stricoff@bstsolutions.com; www.bstsolutions.com.

#### **12 EMBEDDED GALVANIC ANODE PROTECTS CONCRETE REINFORCING STEEL FROM CORROSION**

Galvashield<sup>®</sup> XP is a patented sacrificial embedded galvanic anode that provides localized galvanic corrosion protection in reinforced concrete structures. The anode is a zinc core surrounded by an active cementitious matrix. Once installed, the zinc core corrodes preferentially to the surrounding rebar, thereby providing galvanic corrosion protection to the reinforcing steel. The installation requires little or no change from existing concrete repair practices and only a minimal addition in cost. The Galvashield XP embedded anode has been used in North American since 1998 in a wide variety of applications such as deck repairs, joint replacement, pre-stressed and post tensioned repairs, and interface applications between new concrete and existing chloride contaminated concrete. Contact: David W. Whitmore; Vector Corrosion Technologies, Inc.; 417 Main Ave; Fargo, ND 58103; 701-280-9697; Fax 701-235-6706; davidw@vector-corrosion.com; www.vector-corrosion.com.

#### **13 PREFABRICATED CLADDING DEFENDS STRUCTURES AGAINST AIR BLAST EXPLOSIONS**

Firexx Fortification is a prefabricated construction cladding material that uniquely defends structures against catastrophic effects of air blast explosions. The physical principle behind the material is to 'soften' the structure rather than 'hardening' it to attenuate blast overpressure through thermal and kinetic energy absorption. Firexx Fortification is much lighter and less expensive than blast protection grade reinforced concrete. It is detachable and reusable, non-corrosive, and flexible in terms of shaping. The material is patented worldwide (26 US patents and 111 total patents). Firexx Fortification has been installed for such projects in the Middle East as bomb traps, protection of governmental buildings, guardhouses, and protection of strategic material storage sites. Contact: Ghaleb Al-Hamad; Firexx Corporation/Heat Technology Corp.; P.O. Box 27098, Riyadh, Kingdom of Saudi Arabia 11417; 703-516-0800; Fax 703-516-0800; www.firexx.com.

#### **14 MULTI-USE ELEVATED WATER STORAGE TANK PROVIDES CONCESSIONS AND INDOOR OFFICE SPACE**

In 1997, Lannie Corbin, City Manager of Niceville, Florida, instigated the idea of constructing a distinctive and creative structure to serve the city's Parks and Recreation Department as well as its Water Department and concurrently maximize the use of land. In June 2001 the Chicago Bridge and Iron Company succeeded in executing the idea by using the base of a water tower tank as a ball park facility. The four-level Multi-Use Elevated Storage Tank supplies the City of Niceville with 500,000 gallons of pressurized potable water and also provides 3,900 square feet of indoor office, a 360 degree cantilevered press box, public restrooms, and mechanical equipment and storage space. Contact: Donald O. Nason; Chicago Bridge & Iron Company; 10200 Grogan's Mill Road, Suite 300; The Woodlands, TX 77380; 281-774-2200; Fax 281-774-2202.

#### **15 INTERNET BASED PLAN ROOM IS VIRTUAL PRIVATE NETWORK FOR CONTRACTOR BIDDING**

The iSqFt system was designed to emulate the flow of information throughout the construction bidding process over the internet in lieu of traditional plan rooms. It has two components: Internet Plan Room and Private Construction Office. Each system allows paying subscribers access to plans, specifications, bid forms, site photos, and other relevant project information on projects. Information can be downloaded (even with a dial-up connection) as desired, including printing to scale on plotters. The Private Construction Office allows individual contractors (often general contractors) to post projects they are currently bidding and invite bids from subcontractors online. Contact: Dave Conway; Construction Software Technologies, Inc.; 8926 Beckett Road; West Chester, OH 45069; 513-645-8004; Fax 513-645-8005; info@isqft.com; www.isqft.com.

**16 TEAM-BASED BUILDING DESIGN PROGRAM INTRODUCES STUDENTS TO CONSTRUCTION**

The BDP was developed to introduce construction and its career potentials in a positive and fun manner while presenting challenges in math, science, communication, and design to students. Teams of students design a 1,000 square foot house for a family of four keeping the cost under \$25,000. The program follows a ten-lesson plan that introduces students to the concepts of scale, estimating, converting (e.g. scale), measuring, brainstorming, problem solving, listening, writing, oral speaking, and research/reading. Students maintain journals, floor plan sketches, site layouts, job cost worksheets, scale models, a report on five construction industry careers, and a final report. Contact: Carol Kueker; NAWIC Education Foundation; 1864 B Norwood Dr.; Hurst, TX 76054-3066, 817-282-8321; Fax 817-282-8430; nef@airmail.net.

**17 WORK FLOW MANAGEMENT PROGRESSIVELY REDUCES UNCERTAINTY, MAKES WORK READY**

The Last Planner System (LPS) is a lean production-based project planning and management system that links milestones to crew level assignments. Phase pull schedules are developed by working backward from project milestones to establish the best sequence of activities and durations and determine float. Six weeks before action, activities drop from the phase pull schedule to the lookahead plan. Activities are checked for accuracy of production rate, and constraints are adjusted accordingly. Assignments are determined by foremen, lead hands, design leaders, etc. to reflect the schedules. Throughout the project, the system identifies incomplete activities so they can be resolved. Application of the LPS has indicated simultaneous improvement in cost, schedule, quality, and safety. Contact: Gregory Howell, P.E.; Lean Construction Institute; P.O. Box 1003; Ketchum, ID 83340; 208-726-9989; Fax 707-248-1369; ghowell@leanconstruction.org; www.leanconstruction.org

**18 INTERNET TRACKING OF WORKER STATUS ACCESSES TRAINING AND DRUG SCREENING DATABASE**

A collaborative effort between the Safety Committee of the Great Lakes Construction Alliance, Management and Unions Serving Together (M.U.S.T.), and Coastal Training Technologies Corporation, Safe2Work™ is the proven internet solution that delivers, reports, documents, and tracks the basic safety awareness training and drug screening status of Michigan's unionized construction population. Safe2Work simplifies record keeping for safety professionals and company administrators at all levels, using the internet. Currently, Safe2Work documents and tracks 30,000 drug tests annually and records the 50,000 mastered, online, safety-training tests of 10,800 workers. First endorsed by DTE Energy, the CD-Rom basic safety awareness training of Safe2Work is part of the mandated bid package requirements for General Motors, DTE Energy, Ford, and Daimler Chrysler. Contact: Great Lakes Construction Alliance; 277 Gratiot, Suite 400; Detroit, MI 48226; 313-964-2662; Fax 313-964-5511; info@glca.cc; www.glca.cc; www.safe2work.com.

**19 PLASTIC COVERED STEEL GUARDRAILS PROTECT WORKERS, PUBLIC, AND EQUIPMENT**

For over ten years, Ideal Shield Protective Guardrail has reduced maintenance and material and labor costs and has proven to protect employees and expensive equipment from injury and damage. This guardrail system makes obsolete the easily damaged and often replaced rail of the past. Ideal Shield Protective Guardrail is fabricated using a unique combination of Schedule 40 and Schedule 80 steel pipe encased in a high-density polyethylene thermoplastic tube. This assembly withstands the force of multiple 12,000-lb forklift impacts while maintaining its structural integrity and resisting cracks. Ideal Shield protects some of our nation's best, including Ford, General Motors, Daimler-Chrysler, and now the Detroit Lions new Ford Field Stadium. Contact: Frank Venegas Jr.; The Ideal Group; 2525 Clark St.; Detroit, MI 48209, 313-842-7290; 313-842-7860; info@idealshield.com; www.idealshield.com.

**20 REMOTE DATA ENTRY DAILY TIMESHEET TRACKS CRAFT WORKER HOURS AND QUANTITIES BY COST CODE**

REALabor is a real time labor cost and productivity tool designed for the daily interactive tracking of job site performance. Initially developed in-house but now available commercially, REALabor was developed for the sole purpose of tracking daily labor cost and productivity in a labor-intensive industry without adding tasks to the project supervisor's daily routine. Its use has demonstrated the profitability of knowing this information on a real time basis. After the introduction to other Companies in the industry it was easy to see that our industry and perhaps others were ripe for such a tool. Contact: David H. Arnold; Arnold, Dugan & Meyers; 2712 River Green Circle; Louisville, KY 40206, 502-894-4481; Fax 502-894-4482; darnold@adm.cc; www.REALabor.com.

**21 LAUNCHED STEEL GIRDER BRIDGE ERECTION TECHNIQUE ELIMINATES IN-PLACE STEEL ERECTION**

Environmental and economic constraints with erection of the \$21M, 1,630-foot US 20 Iowa River Bridge in Steamboat Rock, Iowa led project engineers to apply incremental launching for the first time to a long span I-girder bridge. The incremental launching technique had been applied for many years but only to erect more stable concrete box structures. The bridge was launched in ten 302-foot steel I-girder spans. The project began in June 2001 and was completed in Spring 2002. The bridge's successful erection has encouraged similar applications, including a steel I-girder bridge in West Virginia and another in Ohio, scheduled for launching in 2005. NOVA Award Finalist. Contact: David Rogowski; HNTB Corporation; 715 Kirk Dr.; Kansas City, MO 64105; 816-527-2545; Fax 816-472-5013; drogowski@hntb.com.

**22 ULTRA-HIGH PERFORMANCE DUCTILE CONCRETE PROVIDES LONG SPANS WITHOUT REINFORCING**

Ductal is a patented ultra-high performance concrete (UHPC) material with a unique combination of ductility, strength, durability, and aesthetic flexibility. In 2001, a 58' diameter clinker silo in Joppa, Illinois became the first building in the

world to have a long-span roof constructed with Ductal. In comparison to steel silo roofs, Ductal produced thinner, longer, lighter, shapelier sections; was installed in one-third of the time; was more easily transported, handled, and installed; and requires less maintenance. Applications include acoustic sound panels, seawall and bridge anchor plates and beams for a power plant and cooling tower, and a 425' arch for a pedestrian bridge in Seoul, Korea. Future target markets include structural wall panels, leave-in-place forms, poles and pipes, seismic elements and bridges. Contact: Vic Perry; Lafarge Canada, Inc.; 10655 Southport Rd. SW; Calgary, AB T2W 4Y1, Canada; 403-292-9243; Fax 403-278-7420; vic.perry@lafarge-na.com; www.lafargenorthamerica.com.

### **23 HOLISTIC "GREEN" OFFICE BUILDING USES 1/10 ENERGY OF COMPARABLY SIZED BUILDING**

The 32,000 square foot Phillip Merrill Environmental Center boasts numerous innovations that make it a "holistic green" building. The owner spent an extra \$1.5 million on its \$6.3 million headquarters to make it green but estimates it will recover costs in energy and water savings over its first 10 years. The Center uses 2/3 the energy of a comparably sized office building. Features of the building include composting toilets, recycled materials, photovoltaic cells, geothermal heating and cooling, and rainwater collection. The Center uses less than 100 gallons of water per day and releases 60 gallons of wastewater per day to the public sewage treatment plant. The building grounds are low maintenance and take advantage of natural flora. NOVA Award Finalist. Contact: Michael Shultz, VP of Public Affairs; Phillip Merrill Environmental Center; 6 Herndon Avenue, Annapolis, MD 21403; 410-268-8816; MShultz@savethebay.cbf.org; www.cbf.org.

### **24 CONTRACTOR WEB-BASED TRAINING FOR EMPLOYEES, OWNERS, AEs, AND SUBCONTRACTORS**

In April 2002, Turner Construction created Turner Knowledge Network (TKN), a web-based portal that houses both a Document Management System (DMS) and a Learning Management System (LMS) for 4,700 employees on 1,600 projects and over 25,000 subcontractors and all of their trades and craftsmen. DMS transfers knowledge and best practices to employees and new hires and provides them with documents and forms needed in every step of the construction process. LMS provides web-based and instructor-led courses for employees that address their personal knowledge gaps (e.g., OSHA, business skills). Turner saved more than \$70,000 in 2002 in online PC skills training. TKN is being further developed to allow centralized project collaboration and information sharing for all project parties. Contact: James I. Mitnick; Turner Construction Company; 1400 Koppers Building; 436 Seventh Avenue, Pittsburgh PA 15219; 888-800-TCCO; Fax 412-642-2940; jmitnick@tcco.com; www.turnerconstruction.com.

### **25 OPEN CONTROL NETWORK TECHNOLOGY ON A CHIP IS BROADLY ACCEPTED FOR SMART FACILITIES**

In the 1990's, Echelon Corporation created LonWorks, the only existing open, non-proprietary control technology platform that networks everyday products as diverse as semiconductors, boilers, and elevators from different manufacturers and enables them to communicate with one another and to be controlled, monitored, and managed over the internet with a web browser. Previously, the controls world was a fragmented series of separate, monopolized vertical markets. Now LonWorks guarantees interoperability of thousands of manufacturers' products across almost every vertical industry (e.g., HVAC, lighting, security). LonWorks has benefited manufacturers and end users by creating an open market; simplifying control systems design, construction, and installation; and reducing initial/running/management costs. LonWorks has countless successful applications in commercial buildings, industrial settings, transportation systems, homes, and utilities. NOVA Award Finalist. Contact: Steve Nguyen; Echelon Corporation; 550 Meridian Ave.; San Jose CA 95126; 408-938-5272; 888-324-3566; Fax 408-790-3800; qnguyen@echelon.com; www.echelon.com.

### **26 FIBER-OPTIC LASER DECONTAMINATION OF METAL SURFACES IN REMOTE LOCATIONS**

The patented Fiber-Optic Laser Technology for Decontaminating Metals, developed in 1995, is a fiber optic delivery system that permits laser energy to be efficiently ported to remote locations and used for surface cleaning contaminated materials. It addresses the US DOE's need to decontaminate nuclear facilities and the Idaho National Environmental and Engineering Laboratory's many highly radioactive materials that require isolation in glove boxes and hot cells. Compared to traditional labor intensive surface cleaning involving chemicals, steel wool, and soap solutions, the fiber-optic laser system is more efficient, does not generate secondary waste (which requires special disposal), and permits operators to work remotely to prevent radiation exposure. Future applications include destroying hazardous surface chemical or biological contamination. Contact: Martin Edelson; Ames Laboratory - Iowa State University; 130 Spedding Hall; Ames, IA 50011; 515-294-4987; Fax 515-294-1230; edelson@ameslab.gov or martine4@aol.com.

### **27 INSULATING CONCRETE FORMS REMAIN IN PLACE TO INCREASE ENERGY EFFICIENCY**

ECO-Block forms use leading Insulating Concrete Forms (ICF) technology. ECO-Block is superior to earlier ICF systems because it is cost competitive. Reduced expanded polystyrene (EPS) mold and manufacturing costs are passed on to customers. ECO-Block forms are hollow blocks or panels made of plastic foam that construction crews stack in the shape of exterior walls. ECO-Block forms are used to build concrete walls, floors, ceilings, and tilt-up construction. Reinforcing steel is placed and concrete is poured between the foam forms. The forms remain in place permanently as insulation. ECO-Block forms are environmentally friendly, energy efficient, extremely strong, and versatile, and they suppress sounds effectively and allow quick construction. Contact: Jennifer Hansell; ECO-Block LLC.; 4100 N. Powerline Rd. Building I, Suites 1 & 2; Pompano Beach, FL 33073; 954-766-2900; Fax 954-761-3133; j.hansell@eco-block.com; www.eco-block.com

**28 AUTOMATIC REBAR TYING MACHINE REPLACES MANUAL TASK OF TYING REBAR**

U-Tier is uniquely designed to replace the manual and backbreaking process of tying rebar. U-Tier holds the crossed reinforcing bars, feeds the tie wire, and winds, cuts, and ties in one action. The result is a strong, single strand, double wrap tie. It is the only machine available in the world to tie 1 mm (18 gauge) diameter wire. Each tie is a double strand tie, which is completed in 1.6 seconds. U-Tier can be used in numerous applications including highways, roads and bridges, concrete slabs, precast/prestressed elements, electrical vaults, foundations, cages, and manholes. Advantages of U-Tier include productivity improvement, reduction of on-the-job injuries, consistent results, and reduction of material costs by decreasing wire consumption. NOVA Award Finalist. Contact: Takaji Nishimaki; U-Tier / A Division of Toyojamco, Ltd.; 11831 Miriam, Suite A7; El Paso, Texas 79936; 915-595-8825 ext. 22; Fax 915-595-8794; takaji@u-tier.net; www.u-tier.net.

**29 DIGITAL CLOSE-RANGE PHOTOGRAMMETRY HELPS CREATE ACCURATE 3D MODELS**

Photogrammetry, measuring objects from photographs, has been used since the late 1800s, most commonly for mapping large areas from aerial photographs. Digital close-range photogrammetry (CRP) accurately measures objects directly from photographs or digital images captured with a camera at close range. Accurate as-built 3D models of facilities and plant equipment are produced from multiple, overlapping images taken from different perspectives. BE&K As-Built Services created CRP software and processes it has widely used in its consulting. Vexcel developed and markets FotoG™ CRP software that is broadly used for exacting measurements. Eos Systems developed and widely markets PhotoModeler, less expensive CRP software and hardware for a variety of uses. The Nomination shows James W. Sewall's use of CRP on the Waldo-Hancock cable suspension bridge. NOVA Award Finalist. Contact: Jason Szabo, Ph.D.; Vexcel Corp.; 4909 Nautilus Court N.; Boulder, CO 80301; 303-444-0094; Fax 303-583-0246; szabo@vexcel.com; www.vexcel.com. Phillip Zicarelli; As Built Data, Inc.; 205-972-6885; pcz@BEK.com; www.asbuilt.com. Alan Walford; Eos Systems, Inc.; 101-1847 West Broadway; Vancouver BC V6J 1Y6, Canada; 604-732-6658; Fax 604-732-6642; aew@eossystems.com; www.photodeler.com. Brian Norris; James W. Sewall Company; 147 Center St.; Old Town, ME 04468; 207-827-4456; Fax 207-827-3641; norb@jws.com; www.jws.com.

**30 PRESTRESSED CFRP REPLACES STEEL REINFORCING IN PRE AND POST TENSIONED BRIDGE CONCRETE**

The City of Southfield, Michigan, has replaced the old Street Bridge with two parallel concrete bridges, of which one bridge used conventional steel reinforcing, and the other was solely reinforced with carbon fiber reinforced polymers (CFRP) reinforcements, including internal pre-tensioned tendons and external post-tensioned cables. The CFRP reinforcing, with no steel, makes this one of a kind in the world. CFRP is composed of long fibers woven together and encased in epoxy. Its light weight, high tensile strength, and corrosion resistance can increase the potential service life of highway bridges, which reduces safety hazards and maintenance costs. NOVA Award Finalist. Contact: George E. Hubbell, P.E.; Hubbell, Roth & Clark, Inc.; 555 Hulet Dr.; Bloomfield Hills, MI 48302; 248-454-6300; Fax 248-338-2592; ghubbell@hrc-engr.com; www.hrc-engr.com. Nabil F. Grace, Ph.D., P.E.; Lawrence Technological University; 21000 W. Ten Mile Rd., Southfield, MI 48075; 248-204-2556; Fax 248-204-2568; nabil@ltu.edu; www.ltu.edu/engineering.

**31 CONSTRUCTION CAREERS WEB SITE RECRUITS HIGH SCHOOL AND COLLEGE STUDENTS**

Owners and contractors need to attract and recruit the "brightest and best" into construction. However, the construction industry faces the two major challenges of workforce demographics and the image of the industry. The Michigan Careers Recruitment Web Site, www.miconstructioncareers.org, was developed by the Greater Michigan Plumbing and Mechanical Contractors Association (PMC) in 1999 to tackle the construction image problem. It is the first of its kind in United States construction and possibly in the world, and it is the first website for all segments of the construction industry. It has helped changed the way possible applicants view construction, which has increased the number and quality of applicants. Contact: Sandra L. Miller; Greater Detroit Plumbing & Mechanical Contractors Association, Inc.; 1955 Pauline Blvd., Suite 100-D; Ann Arbor, MI 48103; 734-665-4681; Fax 734-665-5051; www.miconstructioncareers.org.

**32 RESIDENTIAL UTILITY TRENCHING MACHINE REDUCES COST OF INSTALLING UNDERGROUND UTILITIES**

In the 1940s, Ed Malzahn wanted to replace the pick and shovel work needed to install residential utility services. Trench digging was slow using a hand shovel and expensive using a large trencher. Malzahn invented the DWP Trencher, which was patented in 1955. The DWP Trencher had two-piece buckets spaced 4" and a digging depth of 24" and moved on a welded frame with four wheels and pneumatic rubber tires. It provided an intermediate digging solution by digging trenches faster with an affordable mechanized process. The DWP trencher has evolved into today's Ditch Witch, which is used in trenching for all underground utilities, including television, internet, telephone, plumbing, and electrical services. Contact: Ed Malzahn; Charles Machine Works, Inc.; P.O. Box 66; Perry, OK 73077; 580-336-4402; Fax 580-336-3458; emalzhan@ditchwitch.com; www.ditchwitch.com.

**33 POLYETHYLENE SHIELD FOR WOOD POSTS/POLES PROTECTS UNDERGROUND WOOD FROM ROT**

Wood post frame construction is attractive for its speed, design flexibility, and value. However, rot decay of subsurface portions of posts limits use. Rot can now be easily and economically prevented by Post Protector, which simply slides over the post prior to its insertion into the ground. Post Protector is made from a specialty virgin polyethylene that has hundreds of years of geo-application life expectancy. It is waterproof, flexible, pliable, and quite strong, so it effectively guards against post decay. Stainless steel lag bolts and washers are installed to compress the pliable sidewall, sealing that location,

and joining Post Protector to the post. Post Protectors provide continuous foundation performance at a low cost. Contact: Ken McDonnell; Post Protector; P.O. Box 187; Pottsville, PA 17901; 570-624-7030; 877-966-8768; Fax 570-622-3700; ken\_mcdonnell@yahoo.com; www.postprotector.com.

**34 ELECTRIC MINI-EXCAVATOR IS QUIET AND FREE OF CARBON MONOXIDE/COMBUSTION FUMES**

Michigan Concrete Sawing purchased one of the first electric mini-excavators in the country. It is similar to other mini-excavators with the single exception that it is powered by an electric motor, which operates without creating any fumes. The only noise it generates is the sound of the bucket as it moves through the material being excavated. The excavator can dig to a depth of 60" and will outwork a crew of 5-6 laborers. It is designed for any job where carbon monoxide fumes might be a problem. It is ideal for excavations inside hospitals and schools or the basements of any building, because it eliminates the hazards of internal combustion engines operating inside a building. Contact: Roger Wilkins; Michigan Concrete Sawing & Drilling, Inc.; 12277 Woodbine; Redford, MI 48239; 734-525-5915; Fax 734-535-0211; wnatho@aol.com; www.michiganconcrete.com.

**35 GROUND PENETRATING RADAR LOCATES UNDERGROUND AND CONCRETE EMBEDDED UTILITIES/ITEMS**

Ground Penetrating Radar Systems, Inc. (GPRS) of Sylvania, Ohio has used its technology since 2001 to help numerous Midwest contractors and engineering firms locate almost anything they want to find on their job sites, including underground utilities. GPRS has recently purchased software that converts scans from radar surveys into a three-dimensional format. No other methods of locating are as cost effective or as convenient. Some scanning systems, such as X-Rays, emit radiation, but radar is hazardless. A GPRS survey can be conducted in an occupied building without disturbing residents or nearby sensitive equipment. Several thousand square feet can be scanned per day on large surveys. Contact: Matt Aston; Ground Penetrating Radar Systems; 8534 W. Central Avenue; Sylvania, Ohio 43560; 419-843-9804; Fax 419-843-3816; matt.aston@gp-radar.com; www.gp-radar.com.