



Nominations for the 2001 NOVA Awards

By Robert I. Carr¹

Abstract: This paper presents summaries of the 35 NOVA Award Nominations received between September 15, 1999 and September 2000 for the 2001 NOVA Awards to be presented March 15, 2001 by the Construction Innovation Forum (CIF) at its annual Innovation Celebration Banquet. Nominations include innovations in concrete, asphalt, foundation, insulation, utility, highway, rehabilitation, prefabrication, modularization, light framing, bridge, and emergency construction. Nominations also include innovations in architectural and engineering design; measuring, monitoring, and testing; equipment; contract and code administration; environmental control; and worker recruiting, training, and safety.

INTRODUCTION

This paper presents summaries of the 35 NOVA Award Nominations received between September 15, 1999 and September 2000 for the 2001 NOVA Awards to be presented March 15, 2001 by the Construction Innovation Forum (CIF) at its annual Innovation Celebration Banquet. Nominations include innovations in concrete, asphalt, foundation, insulation, utility, highway, rehabilitation, prefabrication, modularization, light framing, bridge, and emergency construction. Nominations also include innovations in architectural and engineering design; measuring, monitoring, and testing; equipment; contract and code administration; environmental control; and worker recruiting, 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. Robert I. Carr wrote these nomination descriptions from original drafts of students in CEE 530 – Construction Professional Practice Seminar at the University of Michigan.

1 PRE-ENGINEERED POST & BEAM SYSTEM FOR PREFABRICATED TIMBER STRUCTURES

The Wolf Building System is a pre-engineered non-traditional post and beam construction system. The components are prefabricated and prefinished in a factory setting by various suppliers and can be made of steel, metals, precast concrete, laminated wood, etc. Using these engineered materials assures the system will be free of traditional flaws of post and beam systems, which can include shrinkage, twists, cracks, bending, or loose connections. The Wolf Building System incorporates a patented new component-locking device, the Wolfhook, which can be erected by ordinary trades people. Benefits of this system include increases in structural strength; decreases in overall construction time; and no restrictions on size, shape, form, and design. Keywords: modular.² Contact: Wolf Wilbert; Wolf Creative Design Ltd.; 10616-147 Street; Edmonton, Alberta T5N 3C7; Canada; 780-454-6126; Fax 780-454-6126.

2 PLASTIC DUMP TRUCK BOX DOES NOT DENT, CLEANS EASILY, DOES NOT RUST

The Reiter Plastic Dump Body is a one-piece seamless plastic dump truck body. It provides any dump truck with a less sticky, dent free, no paint needed surface that will increase the productivity of moving any type of load. The slippery plastic allows most material to slide out easily, which decreases dump angle for unloading. Plastic is lighter than steel, which increases payloads. The Dump Body is optionally equipped with a rubber-sealed tailgate that allows transport of liquid based materials, such as sludge and wet-batch concrete without leakage. Dried material residue does not permanently attach to the plastic and is easily removed by a mallet. Keywords: equipment. Contact: Bill Reiter; Reiter Industries, Inc.; 926 East Industrial Drive; Dickinson, ND 58601; 701-225-7090; Fax 701-225-7040.

3 BRIDGE SUSPENDER ELECTRONIC INSPECTION DETECTS EXTERNAL/INTERNAL DAMAGE

Electromagnetic inspection of suspension bridge suspender cables tests entire metal cross-sections of suspender cables to detect internal and external damage such as broken wires, corrosion, cracks, and wear. The test sensor weighs 75 pounds and is built in two hinged pieces that are opened and quickly installed on a tested cable up to 3-inch diameter. The sensor is passed over the cable, and any magnetic field distortion, caused by sharp defects such as broken wires, is detected. This enhances and replaces the currently used visual test. In its first use, two people inspected all 54 cables of a bridge in only 6

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The CIF and the author 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.

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² "Keywords" lists keywords that are not otherwise included in text or title of the nomination summary.

hours, with minimal traffic disruption, and found damage that was otherwise invisible. Contact: Mark J. Bergander, P.E.; Scientific Technologies, Inc.; 170 Fort Path Road, Unit 10; Madison, CT 06443; 203-245-7743; 203-245-8017.

4 INSULATED CONCRETE PANELS ARE PREFABRICATED, THEN FILLED WITH CONCRETE IN PLACE

Insulated concrete panel (ICP) is a new alternative to constructing an insulated wall, using 4' x 8' sheets of extruded polystyrene attached to both sides of a structural steel frame. The panels are delivered to the job site, set on conventional footings, fused together, and then filled with concrete. The structural steel frame keeps the wall straight during and after the concrete pour. This panelization process improves the finished wall quality, increases worker safety, and saves 20% of labor and material cost. ICP walls are poured in place, resulting in a monolithic concrete wall that is structurally superior to pre-cast concrete panels that must be bolted together at the seams. Keywords: prefab, modular, form. Contact: Brian Koehn; Benchmark Resources, Inc.; 70 Grey Rd.; Auburn Hills, MI, 48326; 248-853-9400; Fax 248-853-9320.

5 GENERIC WALL DESIGN FOR 8" AND 12" SINGLE WYTHE CONCRETE MASONRY LOAD BEARING WALLS

The Masonry Institute of Michigan has created the Generic Wall Design, a set of user-friendly masonry details for concrete masonry units (CMU). Generic Wall Design, Volume 1, contains designs for single wythe loadbearing walls for reinforced and unreinforced 8" CMU and reinforced and unreinforced 12" CMU. Designs include several necessary details and focus on provisions to minimize rain penetration. Details are unique because there is no substantial information on flashing single wythe walls. Volume 1 is a printed loose leaf bound reference manual containing 28 drawing sheets, with details and guidelines. It has an accompanying CD-ROM, which can replace the manual. Contact: Daniel S. Zechmeister, P.E.; Masonry Institute of Michigan; 12870 Farmington Rd., Suite A; Livonia, MI 48150; 734-458-8544; Fax 734-458-8545.

6 SIDE-GRIP SHEET PILE DRIVER ALLOWS STANDARD EXCAVATORS TO HANDLE TALL PILES

The Movax side-grip sheet piler is mounted on a standard excavator. It grips sheet pile and pipe and H-beam piles from the side to perform such typical operations as lifting, driving, and extracting piles and compacting. The piler operator can control the direction of a pile and drive it at any angle. Pile length is not limited by lifting height of an excavator, as with traditional pile driving methods that grip the top of the piles. The Movax piler is simpler to operate, and it increases productivity and safety. Keywords: equipment, soil. Contact: Yrjö Raunisto, Unisto Oy; Tölkkiäentie 11; 13130 Hämeenlinna; Finland; +358 3 616 1655; Fax +358 3 616 1641; www.movax.com.

7 LASER SCANNING 3D AS-BUILDING PRODUCES DIMENSIONALLY ACCURATE REPRESENTATION

A laptop driven scanner directs a laser beam over a physical object and determines the position in 3-dimensional space of each scanned point on the object. The result is a "cloud of points" thousands of points in 3-dimensional space from which a 3D CAD model of the object is produced. This solves the difficult problem of interfacing new and old equipment and construction on rehabilitation projects and on complex additions to current facilities. It is quicker, more accurate, and safer than manual field measurements, which are often not even feasible. Its largest current application is a major power plant project by Detroit Edison in Monroe, Michigan. Keywords: automate, retrofit. Contact: Ben Kacyra; Cyra Technologies; 8000 Capwell Dr.; Oakland, CA 94621; Phone 510-633-5000; Fax 510-633-5009.

8 UNDERPINNING PILES OF SEGMENTAL PRECAST CONCRETE REPLACES STEEL PIPE PILES

Jacked segmental precast concrete piles replace the traditional underpinning method of using jacked segmental welded steel pipe piles. This construction method was used to underpin an historic building in Canada, on which the segmental precast concrete piles consisted of cylindrical segments reinforced with steel wires welded to a steel coil. The segments were cast using steel-reinforced concrete with steel fiber. Epoxy provided corrosion protection for the threaded, high strength stainless steel rod that connected the individual segments and maintained continuity of the pile. After completion of the work, several completed piles were tested in compression in accordance with ASTM D1143, Method of Testing Piles Under Static Axial Compression Load. Keywords: prefab, soil. Sital Rihal, P. Eng.; Dillon Consulting Ltd.; 6 Donald Street S.; Winnipeg, Manitoba R3L 0K6; Canada; 204-453-2301; Fax 204-452-4412.

9 BENEFICIATED FLY ASH FOR CONCRETE PRODUCED FROM HIGH/VARIABLE CARBON FLY ASH

Patented, commercially viable, innovative process and equipment remove excess carbon from fly ash. This energy efficient technology economically processes unusable high carbon Class F fly ash into a consistent, low carbon (beneficiated) fly ash called ProAsh that is suitable for concrete. The process is clean, environmentally friendly, efficient, and costs a fraction of other carbon removal processes (carbon burnout, froth floatation) cost. ProAsh has proven a commercial success in power plants in New England, North Carolina, and Maryland. It has also been used in high-performance concrete in structures in New England. Keywords: environment, recycle. Contact: Mark Bury; Master Builders, Inc.; 23700 Chagrin Blvd.; Beachwood, OH 44122; 216-831-5500; 800-628-9990 or Fax 216-831-6910; www.masterbuilders.com.

10 WATER LEAKAGE CONTROLLING CMU RESISTS WATER PENETRATION OF SINGLE-WYTHE WALL

Control-BLK is a concrete masonry unit (CMU) designed for single-wythe wall construction to resist water penetration and interior moisture migration. Many buildings use expensive and time-consuming cavity wall construction to avoid critical water leakage. Replacing cavity walls, the beveled edge, grooved web, and tapered rib details of Control-BLK improve tight joint tooling and provide water-shedding benefits. Comparative tests versus conventional block show that Control-BLK has great capability of reducing water collected inside the concrete block cores. It has produced 25% cost savings, due

to material and labor cost reductions. Contact: Ken Sroka; Master Builders, Inc.; 23700 Chagrin Blvd.; Beachwood, OH 44122; 216-831-5500 or 800-628-9990; Fax 216-831-6910; www.masterbuilders.com.

11 ZERO-WASTE MANAGEMENT SOFTWARE FOR READY-MIX CONCRETE

DELVOmatic is computer software with which ready-mixed concrete producers can implement a zero waste management program. It tracks the disposition of all plastic concrete returned to the ready-mix plant, whether it is combined with fresh concrete and resold, dumped in the yard, used for making blocks, or treated with DELVO Stabilizer or DELVO ESC. DELVOmatic also tracks the disposition of all concrete wash water from ready-mixed truck mixers, and it tracks and records the use of DELVO Stabilizer or DELVO ESC, hydration control admixtures in wash water, same day and overnight stabilization, and long-haul applications. It generates and prints an environmental audit report and a daily, weekly, monthly and yearly profitability report. Keyword: environment, recycle. Contact: Richard Hubbard III; Master Builders, Inc; 23700 Chagrin Blvd; Beechwood, OH 44122; 216-831-5500 or 800-628-9990; Fax 216-831-6910; www.masterbuilders.com.

12 ELECTRIC FAULT RECLOSER AND CONTROL FOR ELECTRIC UTILITY DISTRIBUTION LINES

This improved recloser and control monitors and isolates electrical faults on electric utility distribution lines. The device can be configured to automatically select an alternate power source to customers should the normal source fail due to fault. It will replace five older versions of reclosers and low technology and external communication controls, reduce requirements for spare parts, simplify handling and installation by linemen, reduce labor and equipment costs by 36%, reduce unit weight by 75%, replace the fragile porcelain insulating components with durable epoxy, eliminate all of the oil previously required to insulate the old units, seamlessly integrate into our existing communication system, and virtually eliminate scheduled maintenance. Contact: Jerry Yakel; Cooper Power; 2800 - 9th Ave.; South Milwaukee, WI 53172; 414-768-8315; Fax 414-768-8334; www.cooperpower.com.

13 SCHOOL OF INDUSTRIAL CONSTRUCTION ATTRACTS HIGH SCHOOL STUDENTS TO CONSTRUCTION

The BE&K School of Industrial Construction (SIC) was established in 1999 to attract high school students to construction. The SIC complements the standard high school curriculum, and high school students in the 11th and 12th grade enroll on an elective course basis. The class meets five days a week for three hours during afternoon school hours. The curriculum is taught by certified instructors and involves both classroom training and hands-on experience with emphasis in welding, pipe fitting, electrical wiring, instrumentation, and mechanical/millwright work. Students receive summer jobs and are guaranteed employment upon graduation. The BE&K SIC is the first of its kind targeted at the high school age population. Keywords: human resources. Contact: Scott Flatley; BE&K, Inc.; 2000 International Park Drive; Birmingham, AL 35243; 205-972-6000; Fax 205-972-6779; www.bek.com.

14 GIRDER ALIGNMENT & ERECTION TEMPLATE FOR RAPID ERECTION OF LARGE BRIDGE SPANS

This was used the 195m long 7500-ton main girder for a precast concrete bridge to span the Prince Edward Island to the New Brunswick mainland. A typical mode of fabrication and erection would be to cast the spans of the bridge in place to exacting precision within a small timeframe, due to marine conditions, that would constitute the critical path of the schedule. Instead, a relatively small 100-ton template was fabricated off the critical path cycle match-cast to the hammerhead of the main girder and then pre-installed. This held the pre-cast girder precisely in place during erection while the remaining portions of the bridge spans were dropped in place. Contact: Walter Eggers; J. Muller International; 9444 Balboa Ave, Suite 200; San Diego, CA 92123; 858-974-5005; Fax 858-974-5022; www.jmuller.com.

15 CRIB POST HYDRAULIC SYSTEM RAISES ROOFS OF INDUSTRIAL AND COMMERCIAL BUILDINGS

This system raises existing roofs of industrial and commercial buildings. With hydraulics, any type or size of roof can be lifted to any reasonable height using a patented lifting post called the Cribpost that has a stand-capacity of 25-tons. The system has created a way for buildings with low clear heights to increase their marketability and takes advantages of time, cost and disposal. Many older buildings located in urban areas have an ideal location for warehousing or distribution but are unsuitable for today's high racking, storage, and distribution methods. A roof that would take two to three months to rebuild can be lifted in two to three weeks for about half the cost. Keywords: rehab, recycle, temporary support. Contact: Peter M. Vanderklaauw. Liftplate International, Inc.; 18571 SW 104 Avenue; Miami, FL 33157; 305-233-9000; Fax 305-233-0404; Info@liftplate.com; www.liftplate.com.

16 FIBER OPTIC CABLE IN SEWERS DELIVERS BROADBAND SERVICE QUICKLY IN CITIES

The municipal sewer company of Vienna, Austria developed a safe, flexible method, called CableRunner, of laying fiber optic cabling within existing storm and sanitary sewers in urban areas. Two men on an electric cart attach cable trays to the sewer wall. Up to 500 feet of cable a day can be placed without disrupting traffic or tearing up sidewalks and streets. All buildings can be connected to fiber optics, because all buildings are hooked up to sanitary and storm sewers. CableRunner is widely used in European cities. Contact: Ralph E. Hernandez; CableRunner NA, LLC.; 501 Brickell Key Drive, Suite 500; Miami, FL 33131; 305-374-7920; Fax 305-374-0508; office@cablerunnerusa.com; www.cablerunnerusa.com.

17 ELECTRIC CONTACT BREAKER FOR POWER TOOLS CONTACTING LIVE/ GROUNDED CONDUCTORS

Metabo Contact is an electric contact breaker for power tools used in construction. This adaptation of basic technology is used predominantly for renovation work, and it is particularly useful when drilling into elements containing possible grounded water lines, grounded heating pipes, or oil/gas pipes. Upon exposure to any of these materials, the contact elec-

tronics are activated, the tool's power is cut, and an LED glows red to notify the user of the caution. The contact function can also be switched to the *off* position during use, but it will always default to the *on* position when it is first powered up. Keywords: rehab, retrofit. Contact: John Ham; Metabo Corp.; 1231 Wilson Drive; West Chester, PA 19380; 610-436-5900; Fax 610-436-9072; info@metabousa.com; www.metabousa.com.

18 ON-SITE DRUG-SCREENING PROVIDES IMMEDIATE RESULTS

On-site drug screening is a program to prevent substance abuse on construction sites. The steps in the program are these: New workers receive the screening test, which takes 10 minutes. If result is negative, the worker goes out on the job. If result is inconclusive, the worker does not go to work, the sample is sent to a lab for a confirmation test. If it comes back negative, the worker is paid for the 2-5 days s/he was not allowed to work. Of 12,000 workers tested, 3% were inconclusive, of which 95% were positive. Only 6 people, 0.0005%, were paid for the days they did not work. Keywords: drugs, human resources, safety. Contact: Tim Alter; Rudolph/Libbe, Inc.; 6494 Latcha Rd.; Walbridge, OH 43465; 419-241-5000; Fax 419-725-3079; talter@rlcos.com.

19 LASER TEMPLATING FOR WOOD TRUSS FABRICATION SAVES 50-70% OF JIGGING TIME

In wood truss fabrication, jiggling involves locating lumber-holding devices called pucks, which ensure that the shape of the truss matches its design length, height, and pitch and hold the lumber in place as a roller embeds connector plates into the joints. Laser projection was being used for truss jiggling; however, it was found that jiggling would be more efficient if the laser projected puck location. Unskilled labor need only slide a puck to the laser line until the laser lines up with cross hairs on the puck. The puck is locked into this position. This has reduced time required to jig a truss by 50-70%, which doubles production and improves quality. Keywords: fabrication, automate. Contact: Ed Bianchin, P. Eng.; Virtek Vision International, Inc.; 785 Bridge Street; Waterloo, Ontario N2V 2K1; Canada; 519-746-7190; 519-746-3383; www.virtek.ca.

20 CAREERS WEB SITE DESCRIBES BUILDING TRADES AND LISTS APPRENTICE PROGRAMS

This website recruits apprentice and journey workers for the organized construction industry. It provides a one-stop site for technically inclined workers to access information and contacts on organized training schools, and it describes work of each construction discipline. The site has met overwhelming enthusiasm, and apprenticeship programs have reported improved applicants from contacts with the site. Online for just over a year, the site has received more than 100,000 hits, and many interested individuals have learned about careers in construction. Contact: Sandra L. Miller; Greater Michigan Plumbing & Mechanical Contractors Association, Inc.; 1955 Pauline Blvd, Suite 100-D; Ann Arbor, MI 48103; 734-665-5051; Fax 734-665-4681 sandra@greatermichiganpmc.org; www.miconstructioncareers.org.

21 RAPID RESPONSE MOBILE TRAINING FOR MASONS DELIVERS WHERE AND WHEN IT IS NEEDED

This addresses two concerns: supply of skilled craft workers and tight schedules. The International Masonry Institute dispatches one of three mobile training units when there is not time to send potential craft workers through a formal training program. Rapid Response Mobile Training units deliver career opportunities and quality training where it is needed most. Semi-trailers carry tools, tents, multimedia equipment, and classroom space – everything needed to train 20 pre-apprentices for 12 intense weeks. Training covers technical subjects, including safety and health, blueprint reading, and math, and it uses a series of mockups of all types of masonry details. Students work eight-hour days in this construction site environment. Contact: Clarence Nichols; International Masonry Institute; P. O. Box 755; Cascade, MD 21719; 301-241-5507; Fax 301-241-3571; cnichols@imiweb.org; www.imiweb.org.

22 MODULAR UNITS PROVIDE OFF-SITE FABRICATION FOR PHARMACEUTICAL/BIOTECH MANUFACTURING

This is modular construction of pharmaceutical/biotech manufacturing facilities at an off-site location. Modules are of rugged steel construction with concrete floors and can weigh 30-plus tons. They are assembled at the initial construction site, and process and utility equipment is installed and thoroughly function tested. The modular plant is disassembled and transported to the client's site. There the modules are reassembled and subjected to final validation of all processes and systems. This modular approach assures the client a guaranteed fixed price and schedule at the preliminary design stage because of predictability of quality, schedule, and cost. Moreover, the entire facility is readily moveable to another site at a fraction of new construction cost. Keyword: prefab. Contact: Clas Wallenborg; Pharmadule AB; DanvikCenter 28; S-131 30 Nacka; Sweden; +46 8 588 99 800; Fax +46 8 588 99 888; info@pharmadule.se; www.pharmadule.com.

23 NATIONAL CERTIFICATION OF CRANE OPERATORS IS UNIFORM, NON-POLITICAL TESTING

The National Crane Operator Certification Program (CCO) is a nationwide assessment program that determines competency of crane operators through medical, written, and practical examinations. It developed an independent method of assessing crane operator proficiency. It has "leveled the playing field" by defining the knowledge and skill all crane operators should have to safely operate a crane, and then developing fair and reliable examinations to assess competency. Employers in a wide variety of industries nationwide are adopting the CCO program. It is nationally accredited by a nationally recognized professional credentialing authority and officially recognized by Federal OSHA in a formal agreement signed in February 1999. Keyword: safety. Contact: Graham J. Brent; National Commission for the Certification of Crane Operators; 2750 Prosperity Avenue, Suite 120; Fairfax, VA 22031-4312; 703-560-2391; Fax 703-560-2392; info@nccco.org; www.nccco.org.

24 LASER SURVEY BY HELICOPTER SAVES TIME FOR HIGHWAY DESIGN/CONSTRUCTION

The Texas Department of Transportation (TxDOT) and planners and designers from Parsons Brinckerhoff tested and implemented a helicopter-mounted laser survey using light detecting and ranging technology (LiDAR) to create a digital terrain model for constructing a highway. It saved \$1.5 million and 9 months in constructing 42 miles of I-69. The LiDAR survey used a low flying helicopter, airborne GPS, and 2 GPS base units to obtain data. Data was evaluated using commercial software to create a digital terrain model. Before its implementation, TxDOT evaluated and compared this technology with traditional ground surveyed cross-sections, aerial photogrammetry, and photogrammetry using airborne GPS. LiDAR has also been used for power transmission lines, pipelines, and railroads. Contact: Larry G. Redden; Parsons Brinckerhoff, Inc.; 2777 Stemmens Freeway, Suite 1333; Dallas, TX 75207; 214-638-2888; Fax 214-638-2893; www.pbworld.com.

25 CONTINUOUS ACOUSTIC MONITORING FOR STRUCTURES IDENTIFIES WIRE/STRAND FAILURES

SoundPrint is an acoustic monitoring (AM) system that provides long-term monitoring of structures and bridges to detect failures in tensioned steel elements. AM monitors lower frequency noises than acoustic emission and detects actual breakage of wire elements. The main failures in tensioned components are successive failures of individual wires within a tensioned component without the owner's knowledge, because no reliable inspection equipment is available. SoundPrint now monitors over 4 million square feet of unbonded structures. The system is being installed in several large suspension bridges in North America and in additional post-tensioned bridges in Europe. Contact: Peter O. Paulson; Pure Technologies, Ltd.; 340 12th Ave. S.W., Suite 1050; Calgary, Alberta T2R 1L5; Canada; 403-266-6794 or 800-537-2806; Fax 403-266-6570; www.soundprint.com.

26 POTHOLE PATCHING MACHINE BLOWS LIQUID ASPHALT AND AGGREGATE INTO VOID

The Pothole Patcher is a fully automated spray patching road maintenance vehicle that places asphalt and aggregate into potholes using a telescoping swing boom on the end of a truck. First, the hole is cleaned with a high volume blower, and the same nozzle sprays a tack coat of hot asphalt. Then, aggregate and hot asphalt are combined with the forced air and shot into the pothole. The valve controlling the asphalt is turned off, and a topcoat of aggregate is applied. One-man in the safety of the vehicle cab is more productive and produces higher quality patches than a crew of two or more using traditional throw-and-go methods. The Pothole Patcher can be used year round (above 0 F). Keyword: highway, road, rehab, automate. Contact: Steve Simons; Rosco Manufacturing Co.; 1001 SW 1st Street; Madison, SD 57042; 605-256-6942 or 800-658-5499; Fax 605-256-0240; www.roscomfg.com.

27 EXTERIOR CLADDING INSTALLATION ON HIGH RISE BUILDINGS WITHOUT TOWER CRANE

Unitized curtain wall panels (cladding) are installed entirely from the building's exterior without the use of expensive tower cranes. The Beeche method unloads, stores, transports, hoists, and traverses panels to their installation points. Its advantages are that it radically reduces labor cost to erect curtain walls, and it frees up interior floor space for other trades to perform work sooner and more efficiently. This reduces total construction costs and reduces competition among trades for scheduling expensive tower cranes and materials' elevators at the site, which significantly advances project completion and virtually eliminates glass curtain wall panel breakage. It also frees up critical ground space around the perimeter of the building. Keyword: equipment. Contact: Greg Beeche; Beeche Systems Corp.; S-G Industrial Park Building 202; Scotia, NY 12302; 518-381-6000; Fax 518-381-4603; www.beeche.com.

28 PALLET BARRIER FLOOD FIGHTING USES INEXPENSIVE, REUSABLE FOLDING PALLETS

The Aqua-Barrier is a system of angled pallets and waterproof sheeting that protects against floodwater up to 1.8 meters (6 ft). It can also be used for temporary basins for contaminated water, slurries, and finishing ponds. Pallets are inexpensive, can withstand heavy loads, can be bought or rented almost anywhere in the world, and are very simple to install. They are of galvanized steel sheets and can be folded together to minimize storage space. Pallets require no especial anchorages, because they are anchored to the ground by friction and pressure. They are almost 50 times quicker than sandbagging, and each pallet is equal to 1.5 tons of sand. The system is widely used in Sweden, Holland, and Germany. Keywords: equipment, emergency. Contact: Sten-Magnus Kullberg; Geodesign AB; Tecknikringen 1; 583 30 Linköping; Sweden; +46 13 211955; +46 705 515455; Fax +46 13 211958; kullberg@geodesign.se; www.geodesign.se.

29 SEGMENTAL BRIDGE CASTING MACHINES OF 3 TYPES USED FOR WORLD'S LONGEST VIADUCT

The entire 6-lane, 55 kilometer roadway for the world's longest viaduct was precast in individual segments by the precast segmental method using three different types of casting machines. The three were for a typical casting, pier segment casting, and variable deck geometry casting. Each machine had its own variety of unique innovations to handle segment geometry, production, and durability requirements. All machines included grout sealing for low maintenance, durability, and tie-less design. Low profiling of the machines brought them lower to the ground to reduce labor requirements. Contact: Bob Jennings; EFCO Corp.; 1800 N.E. Broadway Ave.; Des Moines, IA 50313; 515-266-1141; Fax 515-266-6788; www.efco-usa.com.

30 WEB-BASED MANAGEMENT OF PROJECTS PROVIDES ON-LINE COLLABORATION/ COMMUNICATION

The Cephren ProjectNet is an online, Web-based framework of services that enables geographically dispersed teams to collaborate effectively and efficiently. It supports more than 250 file formats, which enables users to view and edit documents and drawings online regardless of whether they have installed the correct vendor's software. ProjectNet is the only

online project management service offering workflow features that enable team members to send requests for information to designers and builders when changes occur or difficulties are encountered. Each online event is time and date stamped to preserve an audit trail through the life of the project. Contact: Robert J. Majteles; Cephren, Inc.; 1072 East Meadow Circle; Palo Alto, CA 94303; 650-845-2000 or 877-429-1557; Fax 650-845-2014; www.cephren.com.

31 SELF-RISING FORMWORK & PLACING BOOM MOVE AS A UNIT ON HIGH-RISE BUILDINGS

A Doka SKE self-rising system was used in Minneapolis for the Hines Tower project. A hydraulic ring line system for the SKE climbers allowed simultaneous operation of 24 cylinders, which permitted the entire formwork perimeter of approximately 114 ft x 40 ft x 12 ft high (4,000 square feet) to be raised at one time, in only 15 minutes. In addition, the Doka SKE Lifting System was customized to accommodate the raising of the placing boom at the same time by withstanding its dead weight and all loads imposed during the concrete pour. This eliminated anchoring the boom to each subsequent lift of formwork. Contact: James H. J. Hughes, III, P.E.; Conesco Industries, Ltd.; 214 Gates Rd.; Little Ferry, NJ 07643; 800-631-1978; Fax 201-641-6254; www.conesco.com.

32 FIBER-REINFORCED POLYMER REBAR IS LIGHTER/STRONGER THAN STEEL WITHOUT CORROSION

Carbon composites are an alternative to steel bars in bridge decks, parking structures, and building facades where corrosion is an issue. The bars do not corrode, and they are easier to install, being much lighter than steel. Their tensile strength is 2 to 3 times that of Grade 60 steel, and they are about 5 times lighter for the same cross section. Bars are made from fiber reinforced polymer laminated composite panel that is cut from a panel to the desired width in rectangular cross-sections. Primary innovative features compared to other composite bars are an improved mechanical bond to concrete, ductility, and variable cross sections that offer efficient use of material. Contact: Petru Petrina; Department of Theoretical & Applied Mechanics; Cornell University; 201 ½ Wyckoff Ave; Ithaca, NY 14850; 607-255-3143; Fax 607-255-2011; pp25@cornell.edu.

33 TIED-ARCH TRUSS ROOF SYSTEM PERMITS FAST ERECTION FOR LARGE ARENAS

The Big Rig Roof System is an innovative design that has met all desired functional requirements of covered sports facilities and provides a platform for rigging and staging events. The system is sized to permit fast roof erection, either with limited shores at center court or with splices made while arches are still "on the hook." Design details allow simple bracing connections to support curved roof decks using economical straight members. Long diagonals that require piece-by-piece erection are eliminated to allow field delivery of shop assembled truss segments that greatly reduce construction time. The evolution brought about by the Big Rig Roof System has integrated advantages of cost, aesthetics, speed, and versatility into a fully coordinated structural arrangement. Contact: Thomas Z. Scarangelo, P.E.; Thornton-Tomasetti Engineers; 641 Avenue of the Americas; New York, NY 10011; 212-741-1300; Fax 212-645-9236; TScarangelo@TTEngineers.com; www.TTEngineers.com.

34 ON-LINE BUILDING PERMITS FOR RESIDENCES PROVIDES 24/7 SERVICE AND SAVES TIME AND COST

Permits On-Line makes the building permit process more efficient. Using digital signatures, valid credit card, and capable web browser, contractors and homeowners can apply for and be issued building permits via the internet for 22 different types of building permits for which a technical plan review is not required. Permits can be obtained on-line 24 hours a day, 7 days a week, cutting the routine for construction permits. Customers can now complete permit applications online, sign applications using a digital signature, pay permit fees, and receive permits, all using a standard browser and printer from their home or office. This saves time, improves service, and reduces costs. Contact: Scott Troyer; City of San Jose; 801 North First Street, Room 200; San Jose, CA 95110; 408-277-5755; Fax 408-277-2977; www.sjpermits.org.

35 EFFLUENT OUTFALL TUNNEL VENTILATION WAS QUICK, INEXPENSIVE, SAFE, AND FLEXIBLE

A critical situation for the 9.5-mile Effluent Outfall Tunnel \$3.5 billion Boston Harbor Project occurred when two divers died during removal of safety plugs at the base of risers. OSHA demanded ventilating the entire tunnel. To do so, a jack-up barge was placed over a riser from which safety plugs had been removed, 110 feet below the water's surface. A caisson attached to the barge was installed and dewatered and left open to the atmosphere over that diffuser. The diffuser manhole cover was opened to the atmosphere through the caisson, and fresh air was pumped into the tunnel through the tunnel shaft on Deer Island. Air was pulled from the ocean end of the tunnel, out through the caisson, to the atmosphere. Contact: Kenneth S. Chin; Massachusetts Water Resources Authority; 100 First Avenue; Boston, MA 02129; 617-788-4949; www.mwra.state.ma.us.