

ENR Marks 50 Years of Excellence

During his first year as ENR editor-in-chief, Arthur J. Fox decided to have the magazine each year recognize the individuals who have made significant contributions to the construction industry. That early effort created the forerunner of ENR's current Newsmakers and was soon expanded to highlight annually one particular person whose achievement deserves special recognition. The 50 Award of Excellence recipients on the following pages reflect the industry's tremendous diversity and its evolution over the past half-century. Some honorees managed megaprojects, while others supervised the creation of military infrastructure in peacetime or oversaw cleanup of the after-effects of warfare or terrorism. Several achieved breakthroughs in engineering or helped U.S. firms penetrate new global markets. Some have flushed out corruption or stood up to pressure. Others have pioneered ecological impacts, investigated failures or advanced social issues. In their various ways, all of them have helped the industry to better serve the public and the nation. —*Scott Lewis*

1966

Lyman Dwight Wilbur



In 1965, the U.S. embarked upon a major commitment of American ground troops to Vietnam. To implement a huge construction program to support U.S. forces, the U.S. Defense Dept. selected a four-company joint venture. Wilbur, vice president of Morrison Knudsen's foreign operations, assumed leadership of the massive crash program. Within 10 months, the workforce swelled to 1,600 Americans and 24,500 Vietnamese laborers. By 1966, 400 projects at 30 sites—ports, airfields, bases and supply depots—were either finished or underway. Wilbur organized a structure to manage the rapidly growing colossus, while forging a 9,000-mile-long logistics pipeline.

1970

John A. Volpe



Volpe, the first permanent U.S. Dept. of Transportation secretary following the agency's elevation to Cabinet-level status, forged a comprehensive transportation policy that dealt with social and environmental factors as well as engineering and economic aspects of projects and development. He pushed the first long-range programs to help cities develop or revive mass transit and set safety and environmental protections as primary considerations in all transportation planning. Volpe employed his deep construction experience and political skills to transform DOT into a consumer-oriented agency. He was a contractor, AGC president and three-term governor of Massachusetts.

1967

Vinton W. Bacon



Following newspaper exposés of widespread graft and corruption at the Metropolitan Sanitary District of Greater Chicago, a mayoral panel began a national search for someone to clean house. The job fell to Bacon, a sanitary engineer known for both his technical know-how and toughness. Within four years, he fired or forced out more than 100 employees for dishonesty or incompetence, cracking down on job selling, supplier favoritism, permit bribery, civil-service exam rigging, faulty construction, kickbacks and payroll padding. Bacon earned the resentment—even hatred—of many politicians, employees, contractors, union officials and organized-crime figures. Before the job was over, he was the target of a bomb threat.

1971

Ray Monti



Monti was a 33-year-old engineer when the Port Authority of New York & New Jersey tapped him as World Trade Center construction manager, possibly due to the critical-path-method experience he gained on a beleaguered heliport project. He spent 18 months organizing a 128-man team and preparing a CPM plan that scheduled construction activities, materials and contractor payments before groundbreaking. Tishman Realty and Construction Co. was the CM-for-fee, responsible for coordinating the trade and supervising construction. Monti let 200 prime contracts, soliciting contractors for alternate proposals for more efficient or less expensive methods, which resulted in numerous improvements.

1968

Edgar F. Kaiser



As a follow-up to his War on Poverty, President Lyndon Johnson established the President's Committee on Urban Housing, directing it to figure out how to marshal "the resources and talents of private industry ... into the rehabilitation of urban slums." He named Kaiser committee chairman. Members included labor leaders George Meany and Walter Reuther, Whitney Young of the National Urban League, and builders Stephen Bechtel Jr. and Peter Kiewit. The committee helped to craft the National Housing and Urban Development Act, which incentivized large companies to build low-cost housing, with the goal of constructing 6 million low-income housing units within a decade.

1972

Fazlur R. Kahn



Khan was a structural engineer with a very fertile mind. In his early 30s, he developed the concept of tubular design, wherein a tall building's perimeter columns serve as wind bracing, eliminating expensive internal wind bracing. The tube reacted to wind as a vertical cantilever, thus eliminating shear racking. He first introduced tubular design with Chicago's 43-story DeWitt Chestnut apartment building, built in 1963. A partner with SOM, he went on to design, also in Chicago, the 1,105-ft-tall John Hancock Building, in which diagonal braces achieved the tube concept by spreading the load to all the perimeter columns and, simultaneously, carrying their share of gravity loads.

1969

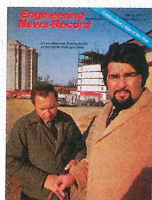
Ezra Ehrenkrantz



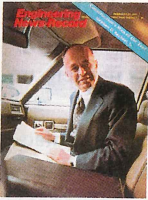
In systems building, engineers and architects in their designs use the large-scale manufacture of compatible building components. Contractors then bid for the erection and assembly of the various subsystems. Ehrenkrantz used systems-building approaches borrowed from the British, who had turned to industrialized techniques to address a shortage of schools after World War II. He and his company, Building Systems Development, designed a single set of components to build 13 public schools in California. Based on performance specifications, manufacturers designed compatible components, saving 20% in project costs. He went on to apply the approach to numerous types of U.S. buildings.

1973

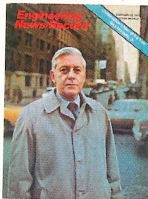
J. Leon Altemose



A 33-year-old general contractor from suburban Philadelphia, Altemose insisted on his right to work open shop. For standing fast against unionized construction, his projects suffered vandalism, fire bombings and destroyed machinery. A mob of 1,000 men burned \$300,000 worth of construction equipment at a project he was building in Valley Forge, Pa., in 1972. He obtained a temporary injunction banning picketing by members of the local building and construction trades council, provoking a demonstration by 25,000 hardhats. Later that summer, he was beaten to the sidewalk by union members. ENR cited him for courageously championing the right to work open shop.

1974**Stephen D. Bechtel Jr.**

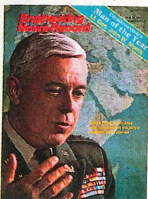
In 1960, as the third generation of Bechtels to take the reins of the family's eponymous contracting dynasty, Stephen Bechtel reorganized the firm into three operating companies, each acting as profit centers and "responsible for getting business, keeping clients, getting the jobs done well and making a profit." He traveled hundreds of thousands of miles each year in his top role. The firm's reputation for organization and quality resulted in nearly 75% of its work being repeat business. Running an empire of 20,000 employees, he constantly searched the world for management talent. During his tenure, the firm built dozens of nuclear powerplants, pipelines, refineries, mines and airports.

1975**Saul Horowitz Jr.**

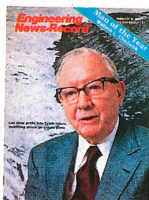
Horowitz, chairman of HRH Construction Corp., realized his long-held dream of establishing a single voice for the U.S. construction industry. Shaped by his military experience at West Point and in the U.S. Corps of Engineers, he said, "I see things in organizational charts and boxes, and I've often wondered why the construction industry has no chart." He thought the industry "would be a hell of a lot more potent in national affairs" if it could speak with "a strong, unified voice instead of a cacophony of voices." While serving as AGC president, he pursued his quest and led 31 associations to form the National Construction Industry Council, which disbanded in the late 1980s.

1976**Frank P. Moolin Jr.**

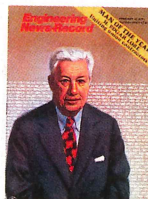
The \$8-billion, 800-mile Trans-Alaska Pipeline carries oil from Prudhoe Bay in the Arctic over a 4,800-ft-high Brooks Range pass to the port of Valdez. Moolin took over as senior project manager several months after work was underway. The project was ensnared in delays, equipment problems and internal acrimony. He broke up the existing management framework and gave more autonomy to the field managers of the five teams building sections. He demanded detailed productivity reports and started competition among contractors. He rode herd on 260 contracts, 11,389 pieces of gear and a peak workforce of 21,600. The first section of pipe was laid in March 1975, and oil flowed in June 1977.

1977**Lt. Gen. John W. Morris**

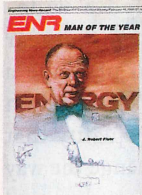
In the 1960s, Saudi Arabia hired the U.S. Army Corps of Engineers' Middle East Division to oversee a vast construction program that included large inland bases, naval bases, the \$3.4-billion King Khalid Military City (population 70,000) and a total of \$7.1 billion in medical facilities. All were designed by U.S. firms and built by a wide range of international contractors prequalified by the Corps, which also procured all the materials. By 1977, the MED employed 743 civilians and 67 military staff, split between offices in Berryville, Va., and Riyadh. The program opened doors for U.S. firms for a wide range of private-sector work in the kingdom. Gen. Morris, Corps chief from 1976 to 1980, directed the \$17-billion program.

1978**Wallace L. Chadwick**

Idaho's Teton Dam, a 305-ft-tall earthen embankment, was completed in 1975. When its reservoir was nearly filled, the dam failed, killing 14 people and causing \$400 million in damage. The failure was the first ever for a Bureau of Reclamation-designed dam. Chadwick headed an independent panel that investigated the failure. A former ASCE president and worldwide dam consultant, he also brought decades of experience at Southern California Edison. Chadwick presided over very sharp debates but managed to meet the panel's six-month deadline. The panel's 585-page report identified design factors that may have caused the collapse, led to a reorganization of BuRec and spurred dam safety inspections.

1979**H. Edgar Lore**

Construction labor relations were fragmented in the 1970s, as unions took advantage of contractor disunity. Local collective bargaining enabled unions to pursue a divide-and-conquer strategy, which led to frequent strikes, unrealistic wages and costly work restrictions. Owners began to patronize open-shop contractors or sign specific project agreements. After a decade of union contractors failing to achieve more unity in bargaining, Lore, a Dravo Corp. executive, in 1978 joined 16 major U.S. contractor groups to form the National Construction Employers Council, which helped to restore order to collective bargaining and make union contractors more competitive.

1980**J. Robert Fluor**

The oil shocks of the 1970s spurred developed countries to seek new sources of oil and alternative fuels in a quest for energy self-

sufficiency. Fluor, who was chairman, president and CEO of Fluor Corp., helped lead the way. The company was the lead designer and construction manager for South Africa's Sasol II and III coal-to-liquid plants. Fluor and Sasol Ltd., which dominated the liquefaction market, entered into a technology-and-operations know-how marketing agreement. In the 1970s, Fluor's synfuels group performed 27 studies of eight coal-gasification technologies for clients as well as 21 coal-liquefaction studies. The U.S. government pulled away from synfuels R&D in the 1980s.

1981**Robert A. Boyd**

Hydro-Quebec set out to build the world's largest electricity production complex in the early 1970s. Phase one of the James Bay Project

cost \$15 billion and entailed building 215 dikes and dams to divert the Eastmain and Caniapiscou rivers into La Grande watershed; the team also built three massive powerhouses along a 288-mile stretch of the river and 3,200 miles of transmission lines. Boyd, the master builder for the 14-year project, was the utility's chief engineer by 1962 and president by 1977. The project was managed by SEBJ, a Hydro-Quebec subsidiary, with Boyd as president. He steered the project around a political takeover attempt and weathered union violence. The workforce peaked at 18,000.

1982**Thomas D. Larson**

In the 1970s, the Pennsylvania Dept. of Transportation was a sinkhole of patronage. Many county political leaders also were road maintenance

superintendents, and highway indebtedness quadrupled to \$2.4 billion, the highest in the U.S. As U.S. attorney for western Pennsylvania, Richard Thornburgh obtained 67 corruption indictments against department personnel. Later, as governor, he named Larson as transportation secretary to clean it up. A Pennsylvania State University engineering faculty member, he had produced a critical study of the agency in 1976. To end patronage, he ordered employees to be hired on a merit basis and granted them civil-service status and union representation.

1983**Charles D. Brown**

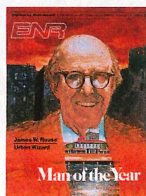
Brown led the Construction Industry Cost Effectiveness Project, an unprecedented effort to streamline construction and

improve productivity. The Business Roundtable sponsored the project in which 23 study teams staffed by 250 participants addressed topics such as safety, technological progress and local labor practices. The task force issued 220 recommendations to interest groups representing contractors, labor and owners. The Corps of Engineers and various owners and contractors adopted some of the measures. One key CICE directive—that owners should make safety an important consideration in selecting contractors—led to the founding of the Construction Industry Institute.

1984**William B. Derrickson**

Nuclear-plant construction was badly off course in the late 1970s: Inexperienced contractors, a dearth of equipment vendors

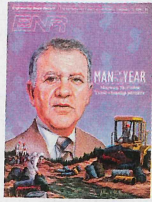
and Three Mile Island-inspired safety rules were factors, while Nuclear Regulatory Commission safety analyses were taking over 30 months. But the key hurdle was the nuclear sector's "negative attitude" toward costs and schedules, which stretched up to 12 years, said Derrickson, project GM for Florida Power & Light's St. Lucie Unit 2 plant. Despite the challenges, which included a hurricane, a toppled crane and a union shutdown, his meticulous planning and motivation of 5,000 workers pushed plant completion in six years, something considered impossible.

1985**James W. Rouse**

Rouse went from being a highly successful real estate developer to founding a philanthropy dedicated to housing the poor. Initially, he

built shopping centers and, later, created Columbia, Md., a planned community whose population had reached 60,000 by 1985. In the 1970s, he pioneered festival marketplaces, such as Boston's Faneuil Hall, which helped to revive urban centers. In 1981, he founded the Enterprise Foundation, which provides technical assistance, grants and loans to community-based nonprofit developers of low-income housing. Through its partners, the foundation, now called Enterprise Community Partners, has developed, to date, over 130,000 units of low-income housing.

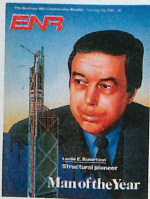
1986

Marwan M. Sadat

Following the Superfund Act's passage in 1980, the U.S. program for hazardous-waste cleanup floundered. Congressional funding was inconsis-

tent. In contrast to balky progress in most states, New Jersey's cleanup program showed strong momentum, thanks to the leadership of Sadat, the state's Dept. of Environmental Protection waste management director. With an aggressive search-and-identify program for toxic hot spots, New Jersey was better positioned than other states to seek federal Superfund money, winning 20% of it by 1986. He stepped on toes to gather high-quality staff, more money and stiff punishments for polluters. In at least 58 cases, he successfully threatened and cajoled polluters to pay for site cleanups themselves.

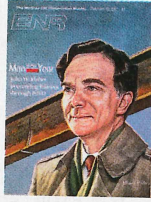
1989

Leslie E. Robertson

For decades, Robertson pioneered efficient structural systems and championed wind engineering research. As a partner at Skilling Helle Christiansen

Robertson, he helped to execute the World Trade Center project. Robertson also helped to develop the first boundary-layer wind tunnel and conducted the first experiments on human sensitivity to building sway. He created a first-of-a-kind composite steel-and-concrete megastructure, the 1,209-ft-tall Bank of China building in Hong Kong. Robertson also conceived the idea for a viscoelastic damper, which he developed and later patented with engineers from 3M Co. He also advanced the International Decade for International Disaster Reduction, organized by the United Nations in the 1990s.

1987

John W. Fisher

Historically, the U.S. construction industry had not devoted much attention or resources to R&D. But Fisher devoted his career to changing that reality.

As a steel fatigue and fracture expert at Lehigh University, he helped conduct postmortems on nearly every major steel-structure failure over a 15-year period. He developed fundamental fatigue curves for welded details exposed to heavy truck traffic. "Fisher's Bridge Fatigue Guide took us out of the dark ages in fatigue failures," said Robert Vecchio of Lucius Pitkin Inc., a metallurgical research lab. In 1986, Fisher became director of the Center for Advanced Technology for Large Structural Systems, the first civil-engineering research center funded by the National Science Foundation.

1990

Vitelmo V. Bertero

A University of California-Berkeley professor of civil engineering and head of its Earthquake Engineering Research Center, Bertero worked to save

lives by advancing the science of earthquake engineering. Motivated by his experience of living through an earthquake in Argentina, he helped to develop the first device to test shear walls dynamically. In the mid-1960s, he performed one of the first tests of dynamic earthquake loads on steel structures; the 1971 San Fernando, Calif., quake confirmed his findings. Later, he prodded the industry to recognize the importance of concrete confinement. He improved testing of base isolators and argued that more federal dollars should be directed toward earthquake engineering, rather than the geosciences.

1988

James W. Poirot

Poirot led a wide-ranging, three-year effort to produce a landmark manual on building quality that would change the way projects are designed

and built. He chaired an American Society of Civil Engineers team that recruited input from 40 authors, 90 reviewers, hundreds of volunteer contributors and 50 professional societies. The first two drafts brought volumes of comment—often harsh but always carefully considered. A CH2M Hill chairman who had long been involved in peer review, Poirot promoted it within ASCE for public agencies. The manual's most controversial section was on shop drawings; its matrix of tasks and responsibilities was a response to the 1981 Kansas City Hyatt Regency walkway collapse.

1991

Jack K. Lemley

A year after construction of the Channel Tunnel began, the England-France crossing was suffering from runaway costs and poor management.

Lemley came aboard as CEO of contractor Transmanche-Link, a consortium of five British and five French companies. He negotiated with the owner, Eurotunnel, to reshape the contract and overhauled project accounting, resulting in significant management and productivity improvements. Lemley bolstered staff morale and boosted the will to proceed, said David Brown, technical adviser to the Transmanche-Link board. With a peak workforce of 9,000, the \$12-billion job dug two 31-mile rail tunnels and a service tunnel and constructed the project's associated railroad system.

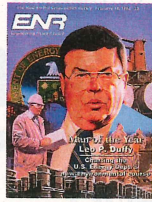
1992

Terry Farley

Bechtel's go-to guy for troubled projects, Farley oversaw the massive mobilization needed to quell 600 flaming oil wells and restore oil production

in war-ravaged Kuwait. He faced delays by cautious Kuwaiti officials and resisted onslaughts by suppliers and labor leaders who wanted pieces of the project. Its workforce reached 11,000, including 28 firefighter teams that had to evade unexploded ordnance. Other teams devised systems to de-emulsify 250 oil lakes. A Hungarian team supplied a jerry-rigged machine—made from a tank body and MIG-21 jet engines—that mixed water and chemicals to put out fires. Defying expectations, the last burning well was extinguished eight months after the war's end.

1993

Leo P. Duffy

Shielded for decades by national security, the Dept. of Energy's nuclear-weapon production sites became spook houses of chemical and

radioactive contamination. Duffy was named assistant DOE secretary in 1989, charged with cleaning up the Augean stables. He crusaded for a culture change, directing outside firms to replace long-serving site contractors in managing cleanups. Duffy was a tough technocrat whose mentor was Adm. Hyman Rickover, the hard-driving Naval Reactors Program founder. Duffy's candor about the mess impressed Congress and helped grow his cleanup budget sevenfold, to \$7.2 billion, by 1994. By then, an estimated 30-year cleanup at 120 sites was projected to cost \$200 billion.

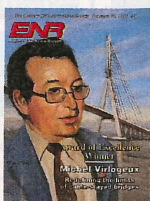
1994

Ginger S. Evans

In the mid-1980s, Denver started to build a new airport before any airline had signed on to use it. Work was well along before Continental

and United committed, which led to 19,000 changes. As the \$3.2-billion project's construction chief, Evans oversaw 300 contractors, 2,000 subs and 10,000 workers. Known for bluntness, honesty and engineering acumen, she goaded the principals of the three key contractors and took on environmentalists, federal regulators, airlines, bankers, two mayors and city officials. Her biggest challenge was peeling away the red tape the city had wrapped around change and claim procedures. During the project, one of Evans' bosses resigned and another died, forcing her to wear three hats.

1995

Michael Virlogeux

During a 20-year career at SETRA, the technical arm of the French highway administration, Virlogeux rose to head the large-bridge

division and designed dozens of spans. He had "a capacity to imagine solutions to new problems," said Bertrand Deroubaix, project manager for the Le Havre Chamber of Commerce. "He started to organize the development of new techniques, such as external prestressing," said Jacques Combault, another leading bridge engineer. His capstone was masterminding the design of the Normandy Bridge. Its main span exceeded the previous cable-stayed record holder by 60%, made possible by adopting aerodynamic deck sections.

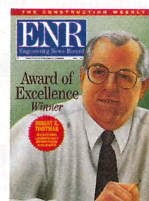
1996

Sherry Plaster Carter

Carter recently had become chief long-range planner for Sarasota, Fla., in 1990 when the city directed her to study ways to reinvigorate

the North Tamiami Trail, a crime-infested corridor lined with rundown motels and buildings. She soon discovered the idea of crime prevention through environmental design, a multidisciplinary approach to deterring criminal behavior and reducing the fear of crime. Carter convinced the city manager to require that all public projects be designed using the new approach. She built consensus among developers to incorporate its principles, helped found what is now the Florida Design Out Crime Association and spread the message across the U.S.

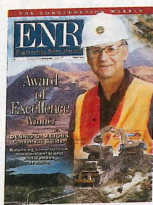
1997

Robert A. Tinstman

In 1995, renowned contractor Morrison Knudsen, through unwise diversification and untimely construction problems, was dying from

a fast-growing tumor of debt. The board forced Chairman William Agee to resign and installed MK veteran Tinstman as CEO. He negotiated with the firm's banks, sureties and regulators and traveled to assure MK's 10,000 employees that it would pull through. With a negative net worth, the company could not book new federal jobs. Tinstman withdrew MK from a privatized bridge construction project and restructured it in a debt-for-equity swap, wiping out the equity of many MK shareholders. To avoid bankruptcy, he merged MK with Washington Construction.

1998

Dennis G. Majors

The Metropolitan Water District of Southern California, the nation's largest water agency, needed to build an additional reservoir. Majors led the \$2-billion effort to build the Eastside Reservoir, the nation's largest earthmoving project, while running an environmental gauntlet. He preempted several possible endangered-species showstoppers by negotiating mediation agreements that preserved or created habitats. To complete the 4,500-acre reservoir, multiple building teams constructed two huge dams. For conceiving two groundbreaking mitigation deals and integrating environmental preservation, Majors was a role model for an industry beleaguered by opposition to many major public works.

1999

John G. Voeller

Black & Veatch Chief Knowledge Officer Voeller was a pioneer and a visionary. In his early career, he played a key role in developing PowrTrak, a single relational database that encompassed all aspects of large capital-facility EPC, which helped B&V land a GE contract to build two nuclear plants in Taiwan. The firm's IT department was spun off, providing services to its former parent while also competing for work. "I hold him out as a role model," said Bill Grossman, CIO for Swiss engineering conglomerate ABB. Voeller's ability to pinpoint trends and implement change without breaking the bank contributed to his technology leadership in an industry rarely appreciated for its high-tech prowess.

2000

Robert M. Thompson

Thompson founded Thompson-McCulley Co. in 1959 with 11 employees, a sprayer, a roller, a jerry-rigged spreader and \$3,500 his wife had saved. The hard-money, low-bid firm grew to be Michigan's largest asphalt-paving contractor. Much of the growth took place through the acquisition of firms whose owners were retiring. Nervous about risk, he developed a daily accounting system that separated the firm from its competition. "Every foreman and manager has to put [daily financial reports] together and learn what jobs are good and bad," he said. After Thompson sold his firm to Oldcastle Materials in 1999 for \$422 million, he split a special bonus of \$128 million among 550 employees and retirees.

2001

Charles H. Thornton

Thornton co-founded and spearheaded the ACE Mentor Program, which guides high-schoolers toward careers in architecture, engineering and construction. ACE also offers college counseling and scholarships. It is designed to aid students and pump fresh blood into a construction industry critically short on talent. Volunteer industry professionals lead biweekly team meetings, working mostly on virtual projects. Founded in 1995, ACE had involved 1,738 students and 269 mentors from 205 firms by 2001. To date, it has expanded to 65 chapters, with 5,300 students and 2,100 mentors. ACE awarded \$1.2 million in college scholarships in 2014.

2002

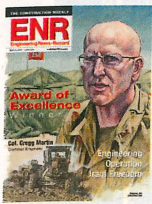
Michael Burton

In the days after 9/11, Burton, the 39-year-old executive deputy commissioner of NYC's Dept. of Design & Construction, emerged to lead a massive mobilization of construction forces at the stricken World Trade Center site. He chose contractors and suppliers without the usual specs, bids or permit applications—and with no time to negotiate fees, contracts or labor agreements. Lives were at stake, property was at risk, and the reputation of NYC's building community was on the line. His skilled leadership of Ground Zero's sometimes fractious response troops transformed them into a unified force that was poised to complete work in April 2002, five months early and hundreds of millions of dollars under original predictions.

2003

Kathi Littmann

By 1999, the Los Angeles Unified School District, which served 750,000 students, had run out of space. Its large, unresponsive bureaucracy and highly politicized school board seemed likely to doom the construction program. A newly elected board majority hired Littmann to jump-start troubled projects. In two years, she rebuilt the 160-person staff, rewrote procedures, bought hundreds of acres of hard-to-secure real estate and completed stamped architectural plans for 160 new projects. The efforts slid under a tight deadline to apply for state funds. Littmann set up extensive community outreach to overcome the smoldering ethnic resentment that was blocking site selection and relocation efforts.

2004**Gregg Martin**

Martin led the U.S. Army's construction mission during the invasion of Iraq in 2003. He coordinated more than 15,000 engineer-soldiers and

shiploads of equipment from dozens of units thrown into the fight. The first 10 months of the operation were devoted to deploying units and gear to the region and erecting huge temporary bases in the Kuwait desert. During the month-long war, Martin's force built and repaired roads, bridges and airfields, sometimes under fire. After capturing Baghdad, his troops began a task that proved to be more difficult: civil reconstruction to ease unrest among the Iraqi people. His force also shouldered the monumental effort to collect and dispose of Iraqi munitions stockpiled all over the country.

2005**Joe Maloney**

In 2001, while speaking at a workshop aimed at helping veterans transition to civilian life, Joe Maloney, secretary-treasurer of

the AFL-CIO's Building and Construction Trades Dept., hatched the idea to form a program that would enlist them in union apprenticeship programs. A second-generation Toronto boilermaker, Maloney gradually brought the 15 building trade unions to the table, working also with nine employer groups, retired Marine Corps Major Gen. Matthew Caulfield and Kenneth Hedman, a labor-relations manager at Bechtel. Begun in 2003 and administered by a non-profit trust, Helmets to Hardhats has placed, to date, nearly 20,000 veterans into the construction trades.

2006**Dwayne McAninch**

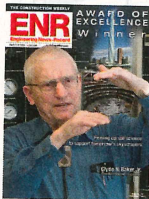
McAninch is a pioneer in the use of 3D earthmoving controls and automated machine guidance, which has reduced rework in

civil construction. As an early adopter of satellite-controlled earthmoving machines, McAninch boosted the efficiency of his firm, McAninch Corp., in bidding, mobilization and project delivery. He also helped suppliers use technology to drive down costs and assisted other contractors to implement innovative project controls. McAninch's leadership helped to pave the way for widespread market adoption of automated machine guidance. He was a key adviser in a 2002 joint venture of Caterpillar Inc. and Trimble Navigation Ltd., a partnership that continues to this day.

2007**Lewis E. Link Jr.**

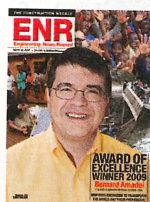
Hurricane Katrina's crushing 2005 assault on flood barriers around New Orleans left a defenseless city filled with debris.

Engineers needed to raise new protections before the next storm but desperately needed to know why the old systems failed and how to improve the new ones. The Army Corps of Engineers handed the task to Link, its retired director of R&D and chief scientific adviser. He ran the independent, high-powered task force that was given nine months to deliver. Through his masterful leadership and a tour de force of excellent science, the team developed timely and significant analysis to guide system design and construction that was core to a new approach in engineering risk strategies for natural-hazard defenses.

2008**Clyde N. Baker Jr.**

Baker raised deep-foundation engineering to a new level by applying science to a specialty that had been based on hunches. Working on

the John Hancock building in the 1960s, he discovered what had caused a defective caisson; his subsequent paper, co-authored with structural engineer Fazlur Khan, brought major code changes. Later, he designed the foundations for many of the world's tallest buildings, including the Sears Tower and the Petronas Towers; he consulted on the Burj Dubai, the current record holder. Baker has played a key role in raising Chicago's allowable bearing loads for large foundations nearly 5,000% over the past 50 years. His work enabled designers to confidently build super high.

2009**Bernard Amadei**

Engineering professor Amadei struggled over whether to consult on a Costa Rica hydro-electric project he knew would displace many locals and

violate the basic "Do not harm" engineering principle. Perceiving a need for small-scale, sustainable projects that could tap the skills and passion of industry practitioners and engineering students, he founded Engineers Without Borders at the University of Colorado. It has grown into a global network at hundreds of college campuses, with affiliates in 42 countries. EWB participants now work on grassroots infrastructure and development projects, improving quality of life across the globe. Its efforts, EWB says, have impacted more than 600,000 people in 41 nations.

2010**John Hillman**

Combining conventional construction materials with stronger, more lightweight components, Hillman created a hybrid

bridge beam of concrete and steel with fiber-reinforced polymers. The glass-fiber-reinforced shell, which has self-consolidating concrete for compression reinforcement and high-strength continuous steel fibers for tension reinforcement, conforms to structural engineering principles. And the ingenious mix of materials yields a structural member that is less bulky than its reinforced-concrete equivalent, said the U.S. Dept. of Transportation. About 18 bridges that use the design are either completed or in construction, and there is growing international interest.

2013**Wayne E. Jones**

The largest chunk of construction in the \$14.6-billion ring of storm-surge defenses built by the Corps of Engineers around post-Katrina New

Orleans is a \$1-billion, two-mile concrete wall across a marshy bay east of the city. Jones—project manager for Traylor Bros. Inc. and an inventive and steady problem solver, team builder and leader—headed construction on a project dubbed the Great Wall of New Orleans. Assembled from thousands of massive components driven, braced and linked into a monolith in soil conditions some compared to Jell-O, Jones designed equipment for driving vertical, batter and in-fill piles, then managed the assembly process, which involved 17 separate, synchronized activities.

2011**Jeffrey Baker**

Baker, in his former role as director of laboratory operations at the U.S. Energy Dept.'s Office of Energy Efficiency and Renewable

Energy, was an agent of change. Thanks to his vision, teams have a field-tested, replicable performance-based design-build model for affordable and ultra-energy-efficient buildings. Baker's 15-year effort resulted in the on-time completion, in 2010, of the National Renewable Energy Laboratory's Research Support Facility, which used a novel contracting method and has a LEED Platinum rating. With a laser focus and bulldog persistence, Baker overcame bureaucratic inertia to establish a new delivery strategy for developing net-zero annual energy-use buildings.

2014**Stephen Selkowitz**

Fascinated at age 21 by designer Buckminster Fuller's "vision of how to fix the world," Selkowitz has devoted his career to realizing Fuller's aim to im-

prove the human condition through "design science." As head of the building-technologies department at the U.S. Energy Dept.'s Lawrence Berkeley National Laboratory, he worked relentlessly to reduce the carbon footprint of buildings and commercialize energy-efficient technologies—for example, low-emissivity windows that cut energy costs by \$7.7 billion. His FLEXLAB is the world's first rotatable rent-a-lab for full-scale building system and curtain wall studies. The test facility, a model for others, has been up and running since last summer.

2012**Theodore Zoli**

Bridgebuilding by consensus sounds like a prescription for disaster. But Zoli has been keenly aware that bridges must satisfy the criteria of

multiple and often divergent stakeholders: moderate cost for owners, boost safety and constructibility for builders, preserve aesthetics and historical fit for the community, and ensure raw utility for daily users. The HNTB Corp. national bridge chief engineer repeatedly has demonstrated an ability to lead design of public works that serve well the public, even when quickly replacing bridges closed for safety reasons. He displays a consistent ability to optimize and integrate innovation with practicality and a tireless dedication to enhancing the safety and well-being of society.

2015**HT Tran**

Serious injury from an improvised explosive device in Iraq in 2008 ended HT Tran's military career plans. But the 35-year-old U.S.

Army soldier honed the skills and drive to launch and grow a construction firm. San Francisco-based Anvil Builders Inc. sets new standards for what veterans and next-generation leaders can do for industry firms. The company now has 85 employees and revenue that is set to exceed \$25 million this year. Anvil's portfolio includes a growing roster of local project partners. As CEO, Tran is an inspired and inspiring advocate for construction entrepreneurship who heads an impressive Bay Area construction outfit that is expanding regional career opportunities for veterans. ■