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Contents

A letter from ARTBA President Pete Ruane . . . . . . . A-4

Here’s to a clear California road ahead . . . . . . . A-7
Good for 100 years in Minnesota. . . . . . . . . . . A-8
Keeping Montana current . . . . . . . . . . . . . . . A-9
Mobility through the Motor City. . . . . . . . . . . . A-10
A “PATH” made clear, a N.Y. “Hub” rising . . . . . . A-11
A long time coming for Miami . . . . . . . . . . . . A-12
Wide open in Illinois . . . . . . . . . . . . . . . . . A-13
Breaking the ice in Ohio . . . . . . . . . . . . . . . A-14
Two-in-one for Kentucky and Indiana . . . . . . . A-15
A firmer float in Washington. . . . . . . . . . . . . A-16
Not in the way in the Midwest . . . . . . . . . . . . A-17
New York style . . . . . . . . . . . . . . . . . . . . A-18
Improved Florida infrastructure . . . . . . . . . . A-19
A Missouri diamond in the rough. . . . . . . . . . A-20
Quietly saving some Virginia green . . . . . . . . A-21
N.J. Turnpike doubles down . . . . . . . . . . . . . A-22
Sorting it out in Nevada. . . . . . . . . . . . . . . A-23
Fixed in a hurry in Florida . . . . . . . . . . . . . A-24
‘Stakeless’ resurfacing through Kansas. . . . . . A-25
A breakthrough in Seattle. . . . . . . . . . . . . . A-26
If the slide fits for Indiana and Kentucky . . . . . A-27
Wisconsin cuts and covers . . . . . . . . . . . . . A-28
Rolling over forward in Utah. . . . . . . . . . . . . A-29
Implementing systemic change in S.C. . . . . . . A-30
In Pennsylvania, an award-winning ABC model . . . A-31
IT’S HARD TO BELIEVE THAT IN THE EARLY 1900s, AMERICA WAS STUCK IN THE MUD.

Railroads were the preferred method of travel, and automobiles and airports were still in their infancy.

Fast forward to 2015. Today, America has the most complex—and sophisticated—intermodal transportation infrastructure network in the world, and the “pick and shovel” enterprise has long been replaced with a high-tech industry that is driven by some of the nation’s brightest minds.

Apple founder Steve Jobs is credited with saying: “Innovation distinguishes between a leader and a follower.” This publication, Economy Driven, is chock-full of examples of innovation and leadership by the public and private sectors in delivering transportation infrastructure improvements. Among some of the noteworthy examples:

"Truss sliding": This unique construction method moved a new 2,400-ft.-long truss along steel rails and plates and “slid” it into place atop the existing piers on a bridge connecting Kentucky and Indiana. The approach was the fastest and most cost-effective way to build the new structure with the least impact on the surrounding area.

Deployment of Low-Cost But Highly Effective Safety Enhancements: To reduce the high number of traffic fatalities at intersections, South Carolina erected oversized yellow, diamond-shaped advance warning signs on the left and right sides of roads ahead of intersections—some with solar-powered flashers mounted on top—and created new pavement markings at 2,000 intersections at a cost $6,000 per intersection. The result: a significant reduction in injuries and fatalities.

Smart Technology: Achieving proper density is critical on asphalt paving jobs. Intelligent compaction is increasingly used by equipment manufacturers. Using sensors and colorful monitors, operators see exactly what sections of the pavement need extra attention, and what sections need to be left alone. In the future, multiple rollers on a jobsite will be able to talk to each other to make sure the proper density is achieved.

Accelerated Bridge Construction: ABC is a technique that allows work to progress concurrently on site and off site. Building the bridge deck section off site and reassembling it on site reduces traffic disruptions, provides a safer environment for workers and motorists, and increases productivity.

Unprecedented Project Coordination: The five-year, $2.3 billion expansion of the New Jersey Turnpike—which doubled capacity when completed in 2014—consisted of interchange improvements and 35 miles of road widening. In addition to the 1,000 workers employed every day, there were 17 general contractors, 327 subcontractors, five construction management firms and 21 utility companies involved in construction. Such a massive project required strong management skills, unified scheduling and cooperation among the private sector and N.J. Turnpike Authority. The partnership paid off, and the project came in $200 million below the estimated budget.

Of course, the real beneficiaries of the projects highlighted in Economy Driven are the American people. Their tax dollars help finance project design and construction.

This publication, which also previews the possibilities of the future, is being shared with all members of Congress and with other key stakeholders around the country to help them better understand why expanded investment in all modes of transportation is critical to Building a Better America!
THE DRIVE TO REVIVE AMERICA’S AILING INFRASTRUCTURE

Everywhere you look, our infrastructure is failing. And with an under-served system, another calamity may be just around the bend. Not only is this a danger to our families and communities, it’s costing us more than we know. Jobs. Economic health. Quality of life. And more. As we strongly support efforts in Washington to federally fund a long-term solution, we can also band together and advocate for infrastructure investment and improvements in our own communities. It’s time to act locally for a state of change.

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To learn more about ARTBA membership, contact Allison Klein at aklein@artba.org or 202.289.4434.
I-91 in Riverside County, Calif., ranks among the nation’s worst commutes. In fact, traffic congestion on the eastbound portion of I-91 between Anaheim and Corona is among the worst areas in the nation.

Led by the Riverside County Transportation Commission, the S.R. 91 Corridor project aims to put a big dent in the general perception of this stretch of road by adding regular lanes, tolled express lanes, auxiliary lanes and direct express lane connectors from northbound I-15 to westbound I-91, and from eastbound I-91 to southbound I-15.

Improvements to interchanges, ramps and surface streets also are being made along the I-91 corridor. These improvements aim to reduce delays, allow faster emergency response and help motorists to, in the words of Caltrans, “fast forward” their travel. In addition, this innovative design-build project is creating 16,200 jobs.

The $1.3 billion project is one of the largest and best congestion relief efforts in California history. It follows a sustainability management plan based on the Federal Highway Administration’s Infrastructure Voluntary Evaluation Sustainability Tool (INVEST).

The project’s specs involve more than 110,000 feet of new drainage and the relocation of 92 full utility systems. More than 320,000 feet of sound barriers will be constructed, and 83 retaining walls will be raised, totaling an estimated 1 million sq. ft. An increase in road safety is expected from a lower speed limit of 55 mph. Thirty bridges will be reconstructed, rescued or otherwise repaired, and another 19 will be widened.

Here’s to a clear road ahead
Major Calif. project shines light on crucial corridor

PRELIMINARY STUDIES HAVE SUGGESTED that once the project is complete, users of regular lanes can save an average of 12 minutes per day when traveling round-trip during peak morning and afternoon hours. Moreover, users of the Riverside County I-91 express lanes can save an incredible 78 minutes daily when compared to using the regular lanes.

PROJECT:
S.R. 91 Corridor

LOCATION:
Corona and Riverside, Calif.

OWNER:
Riverside County Transportation Commission

DESIGNER:
URS Corp.

PARTNER AGENCIES:
Orange County Transportation Authority, Caltrans

CONTRACTORS:
Atkinson/Walsh (Atkinson Contractors and Walsh Construction Co. JV)
Good for 100 years
Longest freestanding arch main span built to last

THE NEW HASTINGS BRIDGE WAS DESIGNED for a 100-year lifespan. In practical terms, it enhances mobility and safety for both the community and the region, and has become part of Hastings’ identity. The Minnesota Department of Transportation (MnDOT) was able to accelerate delivering the project by almost five years after the Minnesota Legislature passed the 2008 Transportation Funding Package. In order to deliver this major project under an accelerated schedule, a competitive contracting process called “design-build best value” was utilized.

The unique 545-ft.-long freestanding tied-arch main span—the longest freestanding arch main span in North America—includes trapezoidal variable depth steel box arch ribs, post-tensioned concrete tie girders and a redundant grid steel floor system. The north approach includes five spans north of the main span and is a pretensioned, precast concrete girder bridge. The south approach is made up of two side-by-side bridges that cover five spans south of the main span into downtown Hastings. It consists of post-tensioned, solid, cast-in-place concrete slabs.

Among the notable challenges addressed over the course of the project, workers operated in a narrow section of the Mississippi River. They dealt with winter freeze-up, spring floods and navigation traffic.

“We certainly overcame high water in the Mississippi River from March through August 2011—significant river elevations that prohibited progression of bridge pier construction in the river and the delays associated with that,” said project manager Steve Kordosky, characterizing some of the project’s challenges. “Then the Minnesota government shut down in summer 2011, which impacted steel fabrication. However, MnDOT’s contractor Lunda/Ames accelerated the project as a result, from a July 2014 target to a fall 2013 target. To do that required a closure of the river’s navigational channel during the navigation season. Lots of commerce going up and down the river during this time, so we worked with the Coast Guard and the shipping community to get it done timely and properly. The project has to date been very well received by the public.”

Interesting fact
THE ENTIRETY OF THE HASTINGS BRIDGE STRUCTURE weighs in at 3,300 tons, among the heaviest bridges in the state. In order to place the structure correctly, 900-ton strand jacks were employed to lift the structure 55 ft. into place. This, to date, marks the heaviest bridge move in the U.S. The application of this bridge-placement protocol bears implications for all future large bridge projects.
Keeping current
Statewide app to ease congestion, keep folks in the know

MDT TRAVEL INFO. MOBILE APP IS A RECENT APPLICATION that provides travelers information for the entire state of Montana, including road conditions, construction projects, road incidents, still-camera images and atmospheric information. The application also allows users to find their current locations and map routes based on address or city name. Routing, addressing and base maps are provided by Google Inc. Additional base maps are provided by ESRI Inc.

During the winter road reporting season of November through April, road conditions are reported twice a day, or as major changes occur. Although the information is not in real time, conditions are updated as changes occur.

The application displays images from remote camera sites along MDT’s road network, and data from the remote weather information systems (RWIS). The atmospheric information is provided by Iowa Environmental Mesonet and is updated every five minutes.

“The mobile application is so informative and easy to use that many of MDT’s 800 Maintenance Division employees use the application regularly,” said Brandi Hamilton of MDT’s Maintenance Division.

The application also provides access to camera images from neighboring states and provinces to show road conditions on various routes in those areas. The MDT Travel Info. Mobile App was made to be highly customizable and has layers that can be turned on and off by the user. These include a road incident layer, a construction layer, an RWIS/camera layer and an atmospheric layer. The base map can also be changed from a default Google map, a Google terrain map and an ESRI line map.

Interesting fact

THE MDT TRAVEL INFO. MOBILE APP, launched in the winter of 2012, quickly generated more than 13,000 downloads despite very little promotion. Prior to the winter season of 2015, the MDT began promotional efforts to increase awareness of the resources available to Montana travelers. Since that media effort, the app has received a total of 34,000 downloads. In the month of November 2014 alone, there were 208,000 map views, 1.4 million webpage views and new users topped 30 percent.
Mobility through the Motor City
Sleek new rail line will offer multimodal transit

THE $140 MILLION M-1 RAIL STREETCAR SYSTEM, currently under construction on Woodward Avenue in Detroit, is an unprecedented public-private partnership and model for regional collaboration. It is the first major public transit project led and funded by private businesses and philanthropic organizations in partnership with local, state and federal governments.

The streetcar will travel north and south on both sides of Woodward Avenue for 3.3 miles (6.6 miles round trip) between Congress Avenue (the Riverfront) and West Grand Boulevard (the North End/New Center neighborhood) once it is completed in late 2016. It will service 20 stations (16 curbside and four median running) at 12 locations. Once operational, the modern streetcar system will boast Wi-Fi, bike storage and level boarding. Additionally, 60 percent of the streetcar line will operate off-wire.

“The M-1 RAIL will serve Detroit’s largest job centers and most visited destinations while providing a foundation for improved and expanded public transit throughout the region,” said Paul Childs, chief operating officer of M-1 RAIL. “The system will ignite tremendous new growth and job creation.”

The M-1 RAIL streetcar project has already awarded nearly 30 percent of construction and concurrent road work for the project to Detroit-based, women- or minority-owned, and disadvantaged business enterprises (DBE). M-1 RAIL’s inclusion percentage is twice the national average when compared to similar projects, and amounts to nearly $40 million in contracts.

To achieve this milestone, the M-1 RAIL project has broken down larger bid packages into smaller ones to ensure local firms could compete for the work. Partnering with the Michigan Department of Transportation (MDOT), M-1 RAIL also has taken steps to help local firms obtain DBE certification. Construction began on July 28, 2014, and is set to be completed in late 2016.
A “PATH” made clear, a “Hub” rising
A massive, state-of-the-art transportation center

THE STATE-OF-THE-ART WORLD TRADE CENTER (WTC) Transportation Hub will serve more than 200,000 daily commuters and millions of annual visitors from around the world. At approximately 800,000 sq. ft., the nearly $4 billion Hub, designed by internationally acclaimed architect Santiago Calatrava, will be the third-largest transportation center in New York City, rivaling Grand Central Station in size. In a joint venture with the Westfield Group, the Port Authority of New York and New Jersey will develop, lease and operate a major retail space at the WTC site, including in the Hub.

The concourse will conveniently connect visitors to 11 different subway lines, the Port Authority Trans-Hudson (PATH) rail system, Battery Park City Ferry Terminal, the WTC Memorial Site, WTC Towers 1, 2, 3 and 4, the World Financial Center and the Winter Garden. It will represent the most integrated network of underground pedestrian connections in New York City.

The Hub features an “Oculus” design, which will give the facility a distinctive, wing-like appearance. When completed, this upper portion of the Transportation Hub will serve as the main concourse. Incorporating 225,000 sq. ft. of multilevel retail and restaurant space along all concourses, the Hub promises to be a destination location, becoming the centerpiece for all of Lower Manhattan.

Close to the Transportation Hub is the Vehicular Security Center (VSC) and Tour Bus Parking Facility construction project. As part of a comprehensive plan developed by the Port Authority, the VSC will be a comprehensive security screening checkpoint for all buses, trucks and cars accessing the WTC site and parking facilities. When complete, this structure will reach five stories underground into a basement with connecting ramps leading to the parking and below-grade facilities of all of the adjacent projects on the 16-acre WTC site.

Interesting fact

A NUMBER OF FAST-TRACKING STRATEGIES and innovative methodologies were employed on the overall project for the Hub, the most eye-catching being the “Oculus,” which will be one of the most complex buildings in the world when it opens, bearing “wings” rising more than 200 feet. These parts were fabricated in Italy and shipped to New York City expressly for this project. In total, 610 pieces of steel weighing more than 12,500 tons make up the Oculus. Additionally, top-down construction of the Transit Hall enabled completion of the Memorial Plaza in time for the 10th anniversary of the 9/11 attacks in advance of the PATH Transit Hall and platforms below.
By connecting S.R. A1A/MacArthur Causeway to Dodge Island, the Port of Miami Tunnel (POMT) project provides direct access between the seaport and I-395 and I-95, creating another entry to Miami in addition to the Port Bridge.

On Oct. 15, 2009, the state of Florida and MAT Concessionaire, LLC, executed the final agreement for the project, which was developed as a public-private partnership (P3) and a design-build, finance, operation and maintenance contract. The concessionaire’s team is comprised of Bouygues Civil Works Florida as the design-build contractor, and Transfield Services Infrastructure as the tunnel operator.

The project is a 35-year concession agreement, which provided 55 months for design and construction, as well as operating and maintaining the tunnel. The agreement will be completed on Oct. 15, 2044.

The POMT has helped improve traffic flow in downtown Miami by reducing the number of cargo trucks and cruise-related vehicles on congested downtown streets, and aids ongoing and future development in and around downtown Miami.

The tunnel has incorporated new technology features, including automatic incident detection and active sprinkler fire suppression systems. In addition, 91 roadway CCTV cameras and a 110-ft. video wall enable display of the entire tunnel interior in less than 15 seconds, while its 50-ft. hurricane flood gates ensure the tunnel will survive storm surges. Air quality is maintained with eight air quality sensors driving the tunnel’s 44 powerful ventilation fans.

Live lane control and dynamic messaging systems ensure timely safety information for motorists, and improved guardrail systems are designed to reduce the severity of accidents.
Wide open
I-90 in Illinois undergoes a major rejuvenation

THE ILLINOIS TOLLWAY IS IN THE PROCESS of rebuilding and widening the Jane Addams Memorial Tollway portion of I-90, which has reached a critical need for infrastructure expansion and modernization. The project is divided into two segments for planning, design and construction purposes: the western segment spanning approximately 37 miles from the cities of Rockford to Elgin, Ill., and the eastern segment spanning 25 miles from Elgin to Chicago.

In November 2014, the Illinois Tollway completed the first segment of the I-90 Rebuilding and Widening Project, opening a rebuilt, six-lane roadway between Rockford and Elgin. Work on the eastern segment of I-90 from Elgin to Chicago is scheduled through 2016, with this year’s work including the start of roadway rebuilding and widening, and continuation of noise wall and retaining wall installation, utility relocation and drainage work.

Construction also includes new and improved interchanges, as well as reconstruction of the Fox River Bridge and local crossroad bridges throughout the I-90 corridor to accommodate the new, wider roadway.

The bridge expansion was facilitated by large-scale barges, which provided mobility to crews and designers. Lane expansions on both eastbound and westbound sides of the bridge required the installation of new systems of piers. The new piers are set beneath the existing bridge, which will then be removed and a new, thicker surface laid down in line with the new piers to maintain the same height.

The concrete girders are reinforced with stainless steel rebar, a cost premium that is expected to mitigate maintenance costs exponentially, reducing cracks in the deck and reinforcing girder integrity.

A gantry system designed and produced exclusively for this project was used to raise the concrete girders and then slide them into place. The gantrys can then be relocated to continue construction further down the bridge. The adoption of the new system of concrete girders, which are much larger than those used in the bridge’s original 1950s-era construction, has allowed designers to reduce the number of pier units from 14 to seven.

Interesting fact

THE GANTRY SYSTEM ALLOWS TRUCKS to pick up beams for the expansion from the existing roadway and place them on the new piers. The Illinois Tollway also is creating a new mobile app that will allow motorists to pay for tolls, eliminating the use of transponders.
Breaking the ice
A new way to solve bridge ice formation

THE VETERAN’S GLASS CITY SKYWAY (VGCS) is a cable-stayed bridge in Toledo owned by the Ohio Department of Transportation (ODOT). Over the past seven winters that the VGCS has been in service, ice up to ¾ inch thick has formed on the stay cables five times.

As the stay cables warm up, ice sheds in curved sheets that can fall and be blown across the bridge. The falling ice sheets pose a potential hazard and may require lane or bridge closure. The ice damage and hazard problem required a team that included experts familiar with icing, the VGCS’s construction, the structural measurement system on the bridge, and green technology used to develop a new solution.

No existing anti-icing or deicing technology was found to be a workable solution. Heating was effective but expensive and time-consuming. Therefore, ODOT elected to manage icing administratively.

Researchers from the University of Toledo developed a sensor system capable of detecting the buildup of a sheen of water between ice and stay sheaths, signaling when chunks may break free.

A real-time ice monitoring system for local weather conditions on the VGCS and the stays collects data from sensors on the bridge and in the region. The study of the past weather and icing events led to quantitative guidelines about when icing accumulation and shedding were likely.

The monitoring system tracked the icing conditions on the bridge with an intuitive interface to provide bridge operators with up-to-date icing information.

If conditions favorable to icing occur, the monitoring system notifies the research team and appropriate ODOT officials. If ice has formed, the monitor then tracks the conditions that might lead to ice fall, which allows officials to mobilize teams to the location and make a decision regarding closure or traffic diversion in case of danger.
THE OHIO RIVER BRIDGES PROJECT, a joint effort between Kentucky and Indiana, is expected to help more than 100,000 drivers every day by improving traffic safety and reducing roadway congestion between southern Indiana and Louisville. Initial planning for the project dates back to 1969, though construction work began in 2013.

The $1.3 billion Downtown Crossing is half of the $2.6 billion Ohio River Bridges project, which Kentucky and Indiana are jointly building to dramatically improve cross-river mobility. The Downtown Crossing includes a new I-65 bridge for northbound traffic, a revamped John F. Kennedy Memorial Bridge for southbound traffic and the rebuilding of the downtown interchanges on both sides of the river.

The East End Crossing—a new bridge and highway connection that will complete an outer loop around the greater Louisville area—is being built and financed as a public-private partnership involving the Indiana Department of Transportation, the Indiana Finance Authority and the contracting team, WVB East End Partners.

When completed in late 2016, the region will have a new bridge that widens I-65 from seven to 12 lanes over the Ohio River in downtown Louisville and a reconstructed Kennedy Interchange where I-64, I-65 and I-71 converge. The new bridge and its counterpart in Louisville’s East End will be the area’s first new bridges in more than 50 years.

A cable-stayed bridge with three sets of twin towers was chosen as the design for the Downtown Crossing and allows for less obstructed views of the downtown Louisville skyline.

The new I-65 Bridge also will take on all northbound- and southbound-diverted traffic off the Kennedy Bridge, which is expected to alleviate rerouting issues. Nearly 28,000 drivers use I-65 South to access I-64 and I-71 on a daily basis, about 12 percent of the nearly 225,000 vehicles that travel across the Ohio River between Louisville and southern Indiana each day.

When the project is completed, all northbound I-65 traffic will use the new downtown bridge and all southbound I-65 drivers will use the Kennedy Bridge.

Interesting fact

THE PROJECT WENT TO GREAT LENGTHS to seek and gauge public input to help determine many design features and aesthetics of the Downtown Crossing. A cable-stayed bridge with three sets of twin towers was chosen as the design, allowing for clearer views of the Louisville skyline.
A firmer float
New Pacific Coast bridge will tolerate more stress

SINCE SPRING 2012, SAILORS ON LAKE WASHINGTON have watched football-field-sized concrete pontoons being locked into place on the water.

A total of 74 massive pieces—measuring 28-ft. tall, 75-ft. wide and 360-ft. long—of the S.R. 520 floating bridge in the state of Washington have been pieced together. The final three are due to fit in spring 2015. The new structure, which will carry six lanes of traffic, is a bit longer than the existing bridge, whose 7,580-ft. floating section currently holds the title as the longest of its kind in the world. It will not have a draw span. Tall sailboats trying to maneuver through Lake Washington would stop traffic 30 minutes at a time, but the new bridge will not lift to allow water traffic to pass. On the east end there currently is a 58-ft. high clearance, and when the project is complete the clearance will be 70 ft. high.

“At least 50 boats are taller than [58 ft.] and have to choose which side of the lake to be on until the new bridge is constructed,” Ian Sterling, spokesperson for the Washington State Department of Transportation (WSDOT), said.

Once the remaining three pieces arrive, a series of 17-ft. long bolts will connect them in place. All of the pontoons come equipped with columns so a road deck could be placed on top. According to Sterling, about 700 sections of road deck were being put in place by April 2015. The pieces are driven out to where they need to be placed.

The new bridge has been designed to handle much higher tolerances than the old one, which would have to be closed during high-wind events due to waves crashing on the road itself. The new floating span will be a bit higher and also able to withstand stronger earthquakes.

The east end approach is nearing completion, and construction on the West Approach Bridge North began in fall 2014. This bridge is almost as long as the main floating bridge and replaces one that was extremely vulnerable to earthquakes.

Though a lack of funding is preventing the West Approach Bridge South from getting off the ground, plans are set.

“The legislature has not fully funded the program at this point,” said Sterling. “They funded all the way from the east side of the bridge, which is now a six-lane highway and has two median transit stops, bike and pedestrian paths, and new carpool lanes. The next goal would be to fund the corridor all the way into Seattle proper . . . to I-5.”

THE EVERGREEN POINT FLOATING BRIDGE is one of only a few spans of its kind in the world. Pontoons are held in place by enormous steel cables that are connected to anchors buried deep in the lakebed. Washington State is reported to have the four longest and heaviest floating bridges in the world.
Not in the way
Respecting the landscape in the Midwest

NOT MUCH CAN GET IN THE WAY OF THE MIGHTY MISSISSIPPI RIVER, and a stakeholder committee wanted to make sure a new bridge didn’t change that.

“A cable stay with towers would be too tall so the committee wanted something with towers that stayed within the river line,” said Paul Kivisto, bridge construction engineer for Minnesota Department of Transportation (MnDOT).

An extradosed bridge design helped lighten the impact. The span features towers just 67 ft. above the bridge deck, and it also allowed for 600-ft. spans instead of traditional 500-ft. pieces, meaning less would be planted in the Mississippi River.

“There are other types of bridges that would have been equally cost-competitive, but this gave the benefit of being cost-competitive and aesthetically pleasing.”

It’s fair to say that construction progress has been equally satisfying. All five of the river piers are in the water and have reached the height of the enormous cross beams. One cross beam—measuring 18.2 ft. high, 15.2 ft. wide and 116.4 ft. long—serves each pier, which is made up of two columns. The cross beams handle the loads of the precast segments and deck, and distribute all the weight to the 10 cable-stayed pylons. According to Kivisto, pier tables, which are built on top of the cross beams, are being placed on two of the piers, and the cross beam of a third pier is half-completed. The other two are awaiting construction. The two columns that form the river pier are supported by a 43-sq.-ft. footing which contains four 9-ft. diameter drilled shafts.

For this project, officials will be able to use iPads and other tablets to access MnDOT’s bridge information management (BIM) system. Users can access inspection reports and photos by simply clicking on a segment of the bridge. This is the largest BIM application for MnDOT.

Come springtime crews will be installing what Kivisto called a “segment lifter,” which will lift pieces of the superstructure in place. Segment erection off piers 8, 9 and 12 will be out to full cantilever (300 ft. off each pier) by the end of summer 2015. When complete, the St. Croix River Crossing will carry two lanes of traffic and a 12-ft. wide pedestrian/bike lane.

Interesting fact

THE LAST THING ANYONE WANTED was a huge, larger-than-life bridge photo-bombing the landscape that includes the Mississippi River. It was essential that the St. Croix River Crossing was part of the Minnesota/Wisconsin aesthetics, so an extradosed bridge design was used.
Under construction since 2013, the New NY Bridge will replace the aging and deteriorating Tappan Zee Bridge when it is completed in 2018. The high-profile dual-span twin bridge, with an estimated project cost of $3.9 billion, is designed to last 100 years without major structural maintenance, according to the New York State Thruway Authority (NYSTA), which is administering the project along with the New York State Department of Transportation (NYSDOT).

It is New York’s first design-build project of this massive size and scope, and officials are working in conjunction with design-build firm Tappan Zee Constructors LLC (TZC), a joint venture of several major and globally known engineering and construction companies. The design-build method fosters innovation project-wide because engineers, contractors and owners have the ability to collaborate in an integrated process.

TZC ensured that many of the bridge components would be prefabricated off site for numerous reasons. The New NY Bridge crosses the Hudson River at one of its widest points, in a heavily residential area lacking the open space needed to fabricate components on site. Off-site prefabrication ensures a safer work environment when assembling components at smaller staging areas close to the project. It also fosters a high level of quality control, allowing the design-build team to decrease costs and better control the schedule.

The design for the 3.1-mile twin-span bridge features angled main span towers at a height of 419 ft. The cable-stayed structure will be one of the widest of its kind in the world upon completion in 2018.

Interesting fact

TZC owns one of the largest barge-mounted, floating cranes in the world—the Left Coast Lifter (LCL). The LCL has the capacity to lift up to 1,929 tons with one pick, allowing the team to place larger pile caps, girders and deck segments while better controlling safety, quality, costs and schedule.
**Improved infrastructure**

**I-4 Ultimate focuses on the big picture**

**TOUTED AS THE LARGEST INFRASTRUCTURE PROJECT IN STATE HISTORY,** the Florida Department of Transportation (FDOT) has begun rebuilding 21 miles of I-4, from west of Kirkman Road in Orange County to east of State Road 434 in Seminole County. The project will result in a variety of innovations, including 25 approved alternative technical concepts and 27 project technical enhancements that aim to entirely transform the Central Florida corridor through Orlando.

By using an accelerated design-build construction schedule, the team also aims to deliver the project to the public in 2021—17 years sooner than they would have through traditional funding methods.

“This is a very aggressive schedule,” said Loreen Bobo, P.E., I-4 Ultimate construction program manager for FDOT. “We are designing and constructing 250 lane-miles in less than seven years.”

Working with a team that includes the design-build joint venture SGL Constructors (comprised of firms Skanska, Granite, and Lane), FDOT is replacing more than 140 bridges, reconfiguring 15 major interchanges, reconstructing the entire existing roadway and increasing the posted speed from 55 mph to 60 mph. A major innovation for the project is the building of four dynamic tolled express lanes (two in each direction), which will effectively manage congestion on Central Florida’s busiest roadway while providing a safer, more functional corridor.

In addition, the project team is pursuing Platinum Envision certification, considered similar to Leadership in Energy and Environmental Design (LEED) certification for vertical construction. The Platinum Envision certification highlights the cost-effective, energy-efficient and adaptable long-term infrastructure improvements embodied in the project.

Interesting fact

**THE FOUR DYNAMIC TOLLED EXPRESS LANES**

will be based on congestion, meaning the toll varies according to traffic volume. The pricing will help maintain traffic flow by monitoring the number of vehicles using the express lanes.

**PROJECT:**
I-4 Ultimate

**LOCATION:**
Orange and Seminole counties, Fla.

**OWNER:**
Florida Department of Transportation (FDOT)

**FINANCING:**
I-4 Mobility Partners (Skanska and John Laing)

**CONTRACTOR:**
SGL Constructors (Skanska, Granite and Lane JV)

**DESIGNERS:**
HDR, Jacobs Engineering Group

**OPERATIONS/MAINTENANCE:**
Infrastructure Corp. of America
DIVERGING DIAMOND INTERCHANGES (DDI) are a relatively new innovation in roadway design, where traffic entering an interchange briefly moves to the other side of the bridge to make a left-hand turn onto an entrance ramp. In Harrisonville, Mo., a DDI was identified as the best option for the I-49/291 interchange, which is undergoing improvements through spring 2016.

“Diverging diamond interchanges are most effective when you have a higher level of turning movement than through movement in an intersection,” said Lee Ann Kell, project manager with the Missouri Department of Transportation (MoDOT).

“You can use a shorter, narrower bridge because you don’t have to incorporate left-turn lanes.”

Rte. 291 serves as the primary access point for I-49, designated as an interstate in 2012. The area is primarily commercial, with more than 60 businesses lining the roadway. MoDOT implemented the first DDI in the U.S. in 2009 when it completed one in Springfield, and has added more since. The estimated cost for the Harrisonville DDI was between $9 million and $11 million, compared to a standard diamond (up to $12.5 million) or a roundabout with loops (up to $13.8 million).

The Harrisonville interchange features a new bridge, new ramps and realigned side roads. “We’re not trying to shoehorn it into the existing bridge structures, which actually made it easier,” said Frank Wetherford, P.E., senior engineer at TranSystems, the engineer of record.

Also of note is the project’s funding, made possible through a transportation development district (TDD) partnership between the city of Harrisonville and local businesses. The city formed a 182-acre district within which an additional 1-cent sales tax was charged to the businesses and designated specifically for the I-49/291 project. MoDOT has accomplished TDD-funded projects before, but this marks the first time that existing businesses have been the primary source of funding.

As of February 2015, the project was estimated at 25 percent complete, with early work focusing on building the new bridge for Rte. 291.
PHOTO BY TOM SAUNDERS OF VDOT

PHOTO BY TOM SAUNDERS OF VDOT

PHOTO BY TOM SAUNDERS OF VDOT

PHOTO BY TOM SAUNDERS OF VDOT

PHOTO BY TOM SAUNDERS OF VDOT

THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) needed to restore 11 60-year-old bridges in Virginia’s capital region of Richmond, all located along I-95 at an intersection of two major interstates with high traffic volume—150,000 vehicles per day.

“It wasn’t an option to do conventional bridge construction where you would shut down one complete side of the interstate, push traffic to the other side and take several months to construct one bridge,” said Scott Fisher, project manager for VDOT.

The tight corridor along I-95 also didn’t provide enough room for conventional bridge construction. To replace the bridges, VDOT used an approach called accelerated bridge construction, or ABC, which utilizes innovative planning, material and construction methods. “We built each bridge off-site and then took them apart like pieces of a puzzle and put them back in place on-site in a matter of 10 hours per night,” said Fisher.

The bridge deck sections were built in pre-constructed concrete units and then transported to the worksite each weeknight between 8 p.m. and 6 a.m. when traffic volumes were lighter. The 11 bridges required 234 pre-constructed concrete units to be replaced over the life of the project.

The casting yard where the off-site work took place eliminated the safety hazards and pressure of high-volume traffic and working 30 feet in the air. The yard also allowed crews to accelerate productivity, focus on quality and finish ahead of schedule. However, building the bridge sections off-site left little room for error.

“We required two separate surveys of each section to be completed independently so that we had the best calculations. Even a couple of inches difference in a 12-section bridge could throw us off completely,” said Fisher.

A massive public affairs campaign utilized the VDOT hotline, the 5-1-1 Virginia program, the project website, social media and other mediums to keep the public informed.

VDOT also worked with local organizations to inform the homeless, who used the bridges for shelter, of alternative options. An independent survey found 87 percent of drivers altered their driving behaviors based on the communication they received.

The project was completed in summer 2014 more than three months ahead of schedule and about $16 million under budget.

PROJECT:
I-95 Bridge Restoration

LOCATION:
Richmond, Va.

OWNER:
Virginia Department of Transportation (VDOT)

ENGINEER:
URS Corp.

CONTRACTOR:
Archer Western Contractors

Quietly saving some green
Accelerated construction benefits Va. project

Interesting fact

ACCELERATED BRIDGE CONSTRUCTION allows work to progress on-site and off-site concurrently. Building the bridge deck section off-site and reassembling them on-site restricts traffic disruptions, provides safer work conditions and increases quality and productivity.
PHOTO COURTESY OF THE NEW JERSEY TURNPIKE AUTHORITY

AT THE PEAK OF ITS CONSTRUCTION, the New Jersey Turnpike Expansion was the largest ongoing roadway project in the Western Hemisphere, with about 1,000 workers employed every day. The five-year-long project cost $2.3 billion and consisted of interchange improvements and about 35 miles of road widening, finally opening to traffic in October 2014.

The expansion, containing 12 lanes of roadway and 170 added lane miles, doubles traffic capacity and is built to accommodate a projected increase in the Turnpike’s congestion. By 2032, northbound traffic volume is expected to increase by nearly 68 percent. Southbound traffic is forecast to increase by 92 percent.

The widening program has eliminated traffic backups at a spot that was known throughout New Jersey as “The Merge,” where five lanes reduced to three. “The Merge” created up to 5-mile backups on weekdays and could clog 10 miles on Fridays or holidays.

There were 17 general contractors, 327 subcontractors, five construction management firms and 21 utility companies involved in construction. With so many players, the New Jersey Turnpike Authority established unified scheduling to decide which contract needed to have the highest priority in certain areas. Sometimes that meant delaying one contractor so another with a higher priority could get its work done.

“There’s a certain cost of doing that, but we were willing to accept it’s the only way you can build a project like this,” said Larry Williams, the Turnpike Authority’s deputy chief engineer in charge of construction. “The process has to be fluid and dynamic.”

The Turnpike Authority, which funded the expansion, also hired a constructability consultant to manage the eight design firms to ensure the sections they were in charge of were compatible with one another. The bonds sold to pay for the project are being repaid with revenue generated by a two-phase toll increase that was adopted in 2008 and has been in full effect since 2012.

The expansion came in at $200 million under its $2.5 billion estimated budget.
Sorting it out
Alignment system considers all costs

WHEN DETERMINING THE SPECIFIC ROUTE FOR A HIGHWAY BYPASS, it’s important to consider all of your options.

By using the Trimble Quantm Alignment Planning System, the firm Carter & Burgess and the Nevada Department of Transportation (NDOT) were able to analyze thousands of possible alignments to produce a list of the top 20 sorted by cost.

The Boulder City Bypass will result in a four-lane divided highway route for U.S. 93 traffic headed to the Hoover Dam and beyond. It will connect the end of I-515 in Henderson to the start point of the Hoover Dam Bypass between Boulder City and Lake Mead. Work began in early April 2015, with the project completion anticipated in early 2018.

The bypass, which is being completed in two phases, presents several challenges, including hilly and undulating terrain. The project also involves several stakeholders, including NDOT, the U.S. Department of Transportation (USDOT) and the Regional Transportation Commission.

The primary purpose of using the Quantm system was to reduce construction costs. By using the system, NDOT and Carter & Burgess were able to achieve cost savings of 10 to 15 percent.

The first phase of the bypass, a 2.5-mile corridor, is being funded by the Federal Highway Administration. It’s envisioned as the initial segment of I-11 to connect Las Vegas with Phoenix—the country’s two largest cities currently not linked together by an interstate. Carter & Burgess is working on phase two of the bypass, a 12-mile section.

“The bypass will reroute traffic away from downtown Boulder City,” said Tony Lorenzi, NDOT senior project manager. “Residents had previously complained about increased truck traffic through the middle of town as a result of the Hoover Dam Bridge’s completion in 2010.”

An $83 million contract has been awarded for the first phase of the project, a four-lane, 2.5-mile concrete interstate freeway. This corridor usually carries 34,000 vehicles daily with heavy truck traffic.

Other project components include a 1,200-ft. long, 28-ft. tall cast-in-place concrete retaining wall with graphics illustrating scenes from the construction of Hoover Dam. It will act as the corridor’s main visual element. The textured, multi-colored retaining wall will be coated with a special anti-graffiti film that serves as a deterrent for taggers.

Interesting fact

BY USING THE QUANTM ALIGNMENT PLANNING SYSTEM, NDOT and Carter & Burgess were able to quickly analyze thousands of possible alignments for the bypass and sort through the top 20 options by cost. That analysis provided a 10 to 15 percent construction cost savings.
On Sept. 26, 2013, a Navy transport ship being towed by tugboats slammed into the superstructure of Mathews Bridge, which spans 7,736 ft. across the St. Johns River in Jacksonville, Fla.

The impact severed a main truss member, one of the bottom beams that support the triangle shape (a truss) of the bridge. Although the bridge did not collapse from losing this primary beam, it was immediately closed to traffic because of safety concerns. In the next 24 hours, architecture, engineering and consulting firm Reynolds, Smith & Hills (RS&H) had to develop and articulate a plan for its five contractors and then—within a day—provide fully detailed drawings to construction crews.

The team had to review steel fabricator drawings in 12 hours—a process that normally takes 30 days. RS&H was able to capture and visualize the effects of the collision by using a full 3-D model of the bridge, which was developed during the 2007 deck replacement. The deck was replaced with a rigid, lightweight Exodermic deck, which may have helped stabilize the bridge after it was hit by the Navy transport ship. RS&H and its subconsultants developed a bold method to restore geometry to the bridge, using a stressed post-tensioning bar and leveraging steel strongbacks, which act as secondary support members to the existing structure, to perform temporary repairs that enabled final restoration of the bridge.

In order to replace the severed main truss, the team faced several unique challenges. First, the connection points for attaching the replacement chord were badly deformed from the force of the impact. A method known as heat straightening was used to restore these points. In addition, a shorter and lighter stub beam was installed at the impact connection point.

Deflections and forces were monitored by more than 100 strain gauges, which the engineers used to ensure tension was being properly and safely restored to the new truss. They allowed the team to dynamically see the stresses on the bridge in real time. These techniques sped repairs and allowed the bridge to reopen to traffic after only 33 days, a full week ahead of the already aggressive deadline.

The use of strain gauges allowed the team to dynamically see the stresses on the bridge in real time. These techniques sped repairs and allowed the bridge to reopen to traffic after only 33 days, a full week ahead of the already aggressive deadline.
WHEN KING’S CONSTRUCTION WAS HIRED IN 2010 TO COMPLETE TRIM WORK AND FINISHED GRADE for a 4-mile section of U.S. Rte. 59 south of Lawrence, Kan., the company decided to go “stakeless” for the trim work.

Instead of running string lines, King’s Construction used a grade-control solution to produce a 3-D model that provided a baseline for surveyors, designers and machine operators. This fostered greater collaboration between surveyors and designers because they could create 3-D visualizations of projects with greater accuracy and real-world geospatial points.

Used in resurfacing projects, manual staking establishes physical horizontal and vertical controls across each section of the road being trimmed. In traditional staking, preliminary lines run across the project site and stakes are reset to keep pace with design changes. This generally requires navigating machines around stakes, which is particularly challenging in intersections or curvy sections of the road.

“Trimble machine control on our trimmer completely eliminated the need for stakes, which means we only needed one grade checker instead of three,” said Dale Ping, an estimator for King’s Construction. “We were able to complete fine grading of the 4-mile stretch of road within 1/4-inch tolerances much more quickly.”

Ping and John Combs from Trimble’s local dealer estimated ROI by comparing the cost of stakeless resurfacing to manual staking methods.

“We looked at the numbers, and to run stringline for this project alone would cost around $89,000,” Combs said. “That is money that King’s Construction realized they would never get back. The cost of the equipment along with the additional savings they were able to realize meant the equipment would basically pay for itself during the first job, and purchasing the technology would be their future.”

The Kansas Department of Transportation (KDOT) was “extremely impressed” by the automatic grade-control system, Ping said. “It really opened the door to other contractors going ‘stakeless’ for future road work.”

‘Stakeless’ resurfacing
U.S. route through Kansas makes it look easy

PROJECT:
U.S. Rte. 59

LOCATION:
Lawrence, Kan.

OWNER:
Kansas Department of Transportation (KDOT)

CONTRACTOR:
King’s Construction

Interesting fact

USING STAKELESS RESURFACING instead of manual stakes eliminated the need to run 17 miles of stringline for this project, saving $89,000. The 3-D grade control solution provided greater accuracy, which prevented re-work of subgrade and also offered additional cost savings for the client.
Project:
Alaskan Way Viaduct Tunnel

Location:
Seattle

Owner:
Washington State Department of Transportation (WSDOT)

Contractors:
Seattle Tunnel Partners, a Dragados USA and Tutor Perini Corp. JV

In 2011, the Federal Highway Administration and the Washington State Department of Transportation (WSDOT) signed a decision to design and build the S.R. 99 tunnel beneath downtown Seattle.

The tunnel is designed to replace the double-deck Alaskan Way Viaduct along Seattle’s waterfront.

The 57-ft. diam., 1.7-mile-long bored tunnel begins on Alaskan Way South near South King Street, moves away from the waterfront at Yesler Way toward First Avenue, and ends at Sixth Avenue North and Thomas Street. With the tunnel, WSDOT aims to create a safer S.R. 99 corridor and remove the seismically vulnerable viaduct, which was damaged in the 2001 Nisqually earthquake, causing the waterfront freeway to sink.

However, the boring machine commonly known as “Bertha” stalled in January 2014 and again in December, putting the project’s original completion date three years behind schedule.

In order to repair the machine, crews had to dig an 80-ft.-diam. access pit to a depth of 120 ft. Soil settlement in the area, as well as concerns over the structural integrity of adjacent buildings, further disrupted rescue operations.

Repair work has picked up, and as of March 31, the damaged machine’s 4-million-lb. front end was raised to the surface for repair. Drilling is expected to resume in August, if the repair process goes smoothly.

Hitachi-Zosen, the manufacturer of Bertha, is funding the repair to the front end, in an agreement separate from the official warranty.

The use of 3-D visualization helps engineers gauge the project’s proximity to other underground structures. It also serves as an effective communication tool to the public, giving residents a clear look at what the finished project will look like and how it will affect the face of their city.

To date, the state of Washington has spent approximately $1 billion of the $1.35 billion contract for the north and south entrances as well as the four-lane highway tunnel that will replace the Alaskan Way Viaduct.

AN $80 MILLION TUNNEL BORING MACHINE called “Bertha” was created exclusively for the project and weighs 6,700 short tons.
If the slide fits
Record-breaking truss-slide process gets it done

SPANNING NEARLY A HALF-MILE, THE NEW TRUSS SLIDE OF THE MILTON-MADISON BRIDGE is one of the longest of its kind in North America. The 2,427-ft.-long truss moved along steel rails and plates and “slid” into place atop the existing piers in April 2014. It is twice as wide as the original structure and carries U.S. 421, connecting the towns of Madison, Ind., and Milton, Ky.

The Kentucky Transportation Cabinet (KYTC) and the Indiana Department of Transportation (INDOT) had determined the deteriorating 84-year-old structure needed “superstructure replacement.” The truss-sliding method was the fastest and least expensive way to build a new bridge with the least impact on the surrounding areas.

To achieve this, contractor Walsh Construction Co., La Porte, Ind., teamed up with design firms Burgess & Niple Engineers of Columbus, Ohio, and Buckland and Taylor Ltd. of North Vancouver, Canada, to build the new bridge.

Original construction estimates put the cost of replacing the Milton-Madison Bridge at approximately $131 million. In February 2010, the project was awarded $20 million in federal funding under the American Reinvestment and Recovery Act. Kentucky and Indiana secured and evenly split funding for the remaining costs.

The new bridge reopened permanently in April 2014, but additional work is being completed. The next tasks include completion of the pier caps, removal of temporary piers, stone placement around river piers to prevent soil erosion and touch-up painting.

Work resumed in March 2015 on the Milton-Madison Bridge as construction crews modified sidewalk bearings, which required raising the sidewalk approximately one inch in some areas. Weather permitting, painting also will resume in April 2015. All work is expected to be complete by the end of May 2015.

Interesting fact

THE MILTON-MADISON BRIDGE IS A JOINT EFFORT between the Kentucky Transportation Cabinet (KYTC) and the Indiana Department of Transportation (INDOT). They secured state and federal funding for the remaining cost of the project, which was evenly split by both states. Construction was projected to create or preserve 1,400 jobs.
THE MITCHELL INTERCHANGE, part of Wisconsin’s southeast freeway system, breathes economic life into urban Milwaukee and the surrounding region. The I-94, I-894 and I-43 system interchange ushers commuters, tourists and commercial carriers into and out of the city, carrying more than 21,000 vehicles daily.

The north-south I-94 corridor has recently been under development, due to the expectation that traffic volumes will increase 30 percent by 2035. A 35-mile freeway project will increase the corridor from six to eight lanes and expand access between south Milwaukee and the Illinois border.

But the deteriorating Mitchell Interchange, built in the 1960s, was considered ill-equipped to handle the anticipated growth. Following the successful design on the Marquette Exchange project, Milwaukee Transportation Partners (MTP), a joint venture of HNTB and CH2M HILL, were called in to address the challenge of the Mitchell Interchange.

When the Mitchell Interchange environmental study was completed in 2006, MTP faced an immediate design challenge: The original freeway configuration was significantly elevated, and, with three service interchanges less than a mile apart, the team had to maintain safe access at those interchanges.

“Initially, we looked at creating a three-level system interchange, but it would have been extremely intrusive to the community,” said Kathleen Matson, HNTB deputy project manager.

Instead, the team designed three cut-and-cover tunnels for the I-43 north and I-94 to I-894 movements. The tunnels allowed roadways to traverse over these movements, replacing seven highly skewed bridges. The approach minimized scheduled closures, lowered the interchange from its previous height configuration and reduced project costs by $10 million.

“The original interchange had eight times the number of statewide accidents,” said Bob Gutierrez, WisDOT project director. “Placing entrances and exits on the right, as MTP did, lowered on accidents and congestion as cars move in and out of system ramps.”

**Interesting fact**

**THE USE OF THREE CUT-AND-COVER TUNNELS** in the design minimized the need for multiple levels of roadway, increased overall safety and reduced the project costs by $10 million.
PHOTO COURTESY OF CAT PAVING

THE I-15 RECONSTRUCTION PROJECT
that runs from Lehi to Spanish Fork near
Provo, Utah, stretches far and wide—far, as in
40 km (25 miles), and wide, as in 10 lanes.

“It’s the largest job we’ve ever been on,”
said Tyler Shepherd, project manager for
Staker Parson Companies. “It’s the largest
job ever in Utah. The fact it’s all being done
in only three years time is amazing.”

The placement of 720,000 metric tons
(or nearly 800,000 U.S. tons) of warm mix
and stone mix asphalt occurred alongside
the construction of 55 bridges, 52 new
and widened on/off ramps, 20 arterial side
streets and 4,000 drainage boxes.

Staker Parson used a 3-D guidance
system on the main portion of the interstate
to keep the paving surface uniform and
smooth. The 3-D system utilizes a virtual
design to guide the screed—a basic com-
ponent of an asphalt paver that flattens,
smooths and partially compacts asphalt
mix into a flexible road surface—in order to
place asphalt materials with precision in
grade, slope and elevation.

“Anything that we paved that would
go under the concrete, we used the 3-D
system,” Shepherd said. The 3-D paving
system directly contributed to the crews’
ability to keep the project moving forward
at remarkable speed.

Each crew placed about 1,361–1,542
metric tons (equivalent to 1,500–1,700 U.S.
tons) per day, or about 136–181 metric tons
(150–200 U.S. tons) of mix per hour. The mix
would have moved faster if not for frequent
obstacles. “When we weren’t paving
bridges, there were days we hit 300 tons
(272 metric tons) per hour,” Shepherd said.

While the paving and compaction
went well throughout the project, logistics
proved challenging.

“The biggest obstacle we didn’t see
coming was how many times we would
have to move a crew from one area to
another because of scheduling needs,”
Shepherd said. “But we all communicated
and worked well together. It’s been a
challenging project in many ways, but very
definitely a good one.”

Shepherd concluded, “You just have to
be patient and realize you’re not going to
be able to place as many tons as you’d
like every day. But we understood that
going in.”

Rolling ever forward
Multiple challenges in Utah helped by 3-D assist

PROJECT:
I-15 Reconstruction

LOCATION:
Provo, Utah

OWNER:
Utah Department of Transportation (UDOT)

DESIGNER:
Staker Parsons
Companies

CONTRACTOR
Provo River Constructors

Interesting fact

EACH WORK TEAM PLACED 1,361–1,542 metric tons
of warm mix asphalt and/or stone mix asphalt each day, or
about 136–181 tons per hour. The 3-D system used helped keep
the paving surface smooth and even.
AFTER BEING DESIGNATED AS HAVING ONE OF THE HIGHEST PROPORTIONS OF TRAFFIC FATALITIES at intersections in the nation, South Carolina sought a new approach to improving safety and saving lives on its roadways. It partnered with 3M and the Federal Highway Administration (FHWA) to implement a series of simple fixes at nearly 2,000 locations, resulting in a significant reduction in crashes at a relatively low cost.

What changed in the transportation officials’ approach was the use of data analysis to identify the most dangerous intersections in the state. Rather than addressing troublesome spots on a case-by-case basis, they installed relatively low-cost fixes, such as larger signs and new pavement markings. An early analysis of 458 of the nearly 2,000 updated intersections found a 22 percent reduction in crashes overall, showing that these simple methods were a more cost-effective solution.

To pay for these fixes, South Carolina drew money from the Federal Highway Safety Improvement Program. Other states also are increasingly using their safety funds to implement similar system-wide changes. Hiring a private contractor significantly reduced the estimated 20 years it would have taken South Carolina workers to complete the job. 3M completed the job in 2013 after three years, with an average cost of $6,000 per intersection and a project total of $12 million.

Officials believe the project was instrumental in helping prevent crashes and fatalities. Aside from the reduction in overall crashes, there was a 34 percent drop in crashes at intersections without traffic signals and 43 percent reduction in nighttime crashes at those same intersections.
An award-winning ABC model
Crucial bridge is erected in record time

IN AN EFFORT TO REDUCE ITS STATEWIDE LIST of bridges that are considered structurally deficient, the Pennsylvania Department of Transportation (PennDOT) has increased accelerated bridge construction (ABC) projects across the Commonwealth. One project, while modest, made a fine example of applied cost efficiency and successful time and worksite management.

The S.R. 288 Bridge project in Lawrence County, Pa., involved the replacement of the bridge that spans Wampum Run on an accelerated schedule. Because losing access to the bridge meant a 22-mile detour for the 4,500 vehicles that cross the bridge each day, PennDOT District 11-0 officials bid out the project for an ABC model and design to minimize the time the bridge would be out of service.

The existing 60-ft. concrete arch structure carried S.R. 288 over Wampum Run and provided an important crossing for both residents and the local trucking industry.

The winning contractor, Joseph B. Fay, employed a modular 78-ft. steel rolled beam structure founded on integral abutments. In what was initially estimated to take a month, Fay completed the project in only seven days, from initial closure to full reopening to traffic.

Johnson, Mirmiran & Thompson’s (JMT) structural engineers proposed a design employing precast units for the pile caps, wingwalls, cheekwalls, backwalls, approach and sleeper slabs units. The concrete deck and barriers were cast to the steel beams off-site using conventional methods, creating three modular units, and the beam modules were connected with ultra high-performance concrete, a concrete with a 28-day strength of more than 22 kilopounds per square inch (ksi).

The S.R. 288 Bridge project stands as an example of how ABC can be applied to areas in which the closure of a bridge or re-routing of traffic would lead to hardships for local communities.

Interesting fact

STRUCTURAL ENGINEERS PROPOSED A DESIGN employing precast units for the pile caps, wingwalls, cheekwalls, backwalls, approach and sleeper slab units.
Once you experience G+ controls, you won’t be satisfied with anything else. It’s a control system that is both easy to learn and easy to operate. G+ expresses itself in easy to understand international icons and full script explanations. It operates in all the major languages of the world in either imperial or metric numbers. It has a lightning-fast processing speed and features two-way communications between paver accessories and G+. Its instant digital feedback combined with the tight closed-loop electronic and hydraulic control creates a G+ paving experience that is smooth, efficient, and accurate. There is nothing on the market that can compare, because G+ was designed by our in-house team from what we have learned from years of experience in the field and from what we have learned from you, our customer. Isn’t it about time you had the world’s most revolutionary control system on-board?