AB CONNECTIONS

Fall 2017 - Issue #1007

PRESERVING A VITAL CONNECTION

M48 Severn Bridge cable inspection crosses the finish line ahead of schedule

Cover: M48 Severn Bridge with the gantry in its final high level location.

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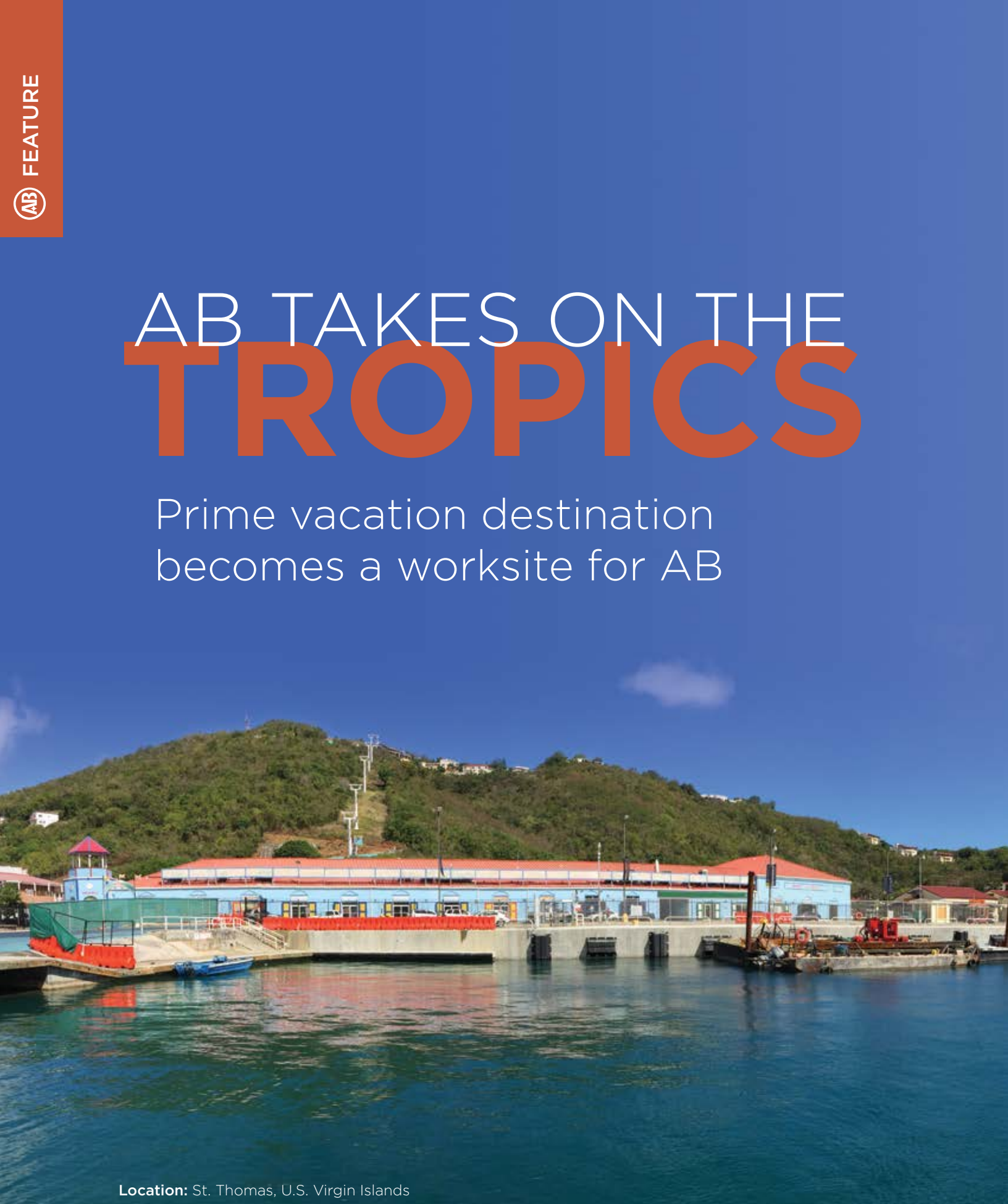
AMERICAN BRIDGE CONNECTIONS
Fall 2017 – Issue #1007

American Bridge

AB TAKES ON THE TROPICS

Prime vacation destination becomes a worksite for AB



Location: St. Thomas, U.S. Virgin Islands
Owner: The West Indian Company, Ltd.

Cruises have become an immensely popular vacation choice, giving travelers a chance to see many exotic places within a single trip. Because of this, cruise ship ports have seen an annual increase in activity of about 7% since 1980*, becoming the victim of excess wear and tear. But these luxurious and coveted vacations wouldn't be possible without the ports that allow ships to dock and passengers to disembark and roam the islands.

The West Indian Company (WICO) Cruise Facility, located in picturesque St. Thomas of the U.S. Virgin Islands, was in desperate need of repairs. The port itself is over 100 years old and on average, hosts up to 200 ships per year, with as many as 10,000 passengers flooding the dock on its busiest days. But with age—and a great deal of use—comes deterioration. Cruise ships have also evolved over the last century, becoming larger and heavier, so improvements were necessary to keep the facility in working order. The cruise ship port had a debilitating bulkhead wall, as well as out-of-date bollards that were not capable of handling modern day cruise liners.

In the 1990s, AB started to flirt with the marine construction industry. With the help of dedicated AB employees in Florida, AB's complex marine construction capabilities expanded and have become a large part of the company, with a growing list of successfully completed projects. In June of 2016, AB was awarded the Inner Berth Bulkhead Improvements and Bollard Replacement for the WICO Cruise Facility to enhance the safety of the port. The WICO Berth is a 3,300' marginal protected wharf with 30-34' depth alongside that can host up to three cruise ships at a time.

CONSTRUCTION COMPONENTS

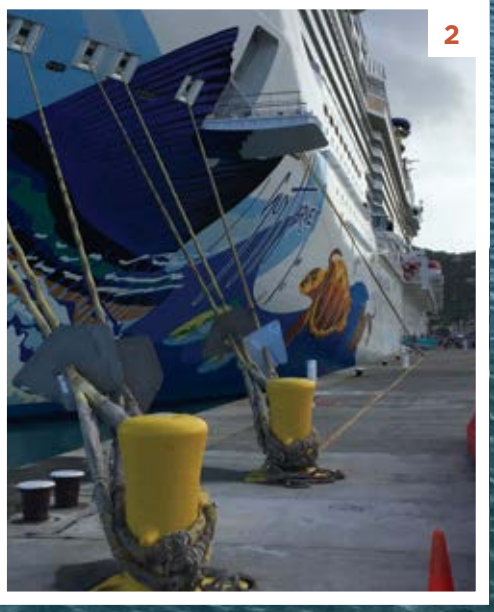
For engineering purposes, AB teamed up with CH2MHILL who performed a majority of the engineering at hand. However, AB's in-house engineering department supported the project from our Coraopolis, Pennsylvania office. Nick Greco, Chief Engineer, led the engineering efforts for a handful of operations, including the new 50' cantilever dock form. As the general contractor, AB self-performed much of the work, including the demolition of the existing cap, installation of new sheets, excavation and installation of the concrete mooring bollards, installation of the fenders, coring of holes into the bulkhead and sheet piles, and all miscellaneous concrete work.

One of the key elements to strengthening the inner berth of the dock was the addition of 621' of bulkhead. The new bulkhead was placed in front of the inner berth wall using pre-poured concrete slabs.

Formwork, provided by the company EFCO, was hung from the bulkhead and used to pour bulkhead concrete. AB also hung a total of 38 new fenders on the bulkhead wall to protect the ships from the dock.

New bollards were also essential to keep the port up and running. In the past, a bollard was ripped from its foundation and unexpectedly launched down the dock, narrowly missing several passengers. This left no doubt that updates for new bollards were critical for this century-old structure. Two different types of bollards were installed—SB-150 and MT-150. Some were placed on the new bulkhead, while others replaced old bollards in other areas of the existing dock. A total of 28 new bollards were installed.

Photo 1: Wood formwork, rebar cages, as well as the EFCO forms and bulkhead rebar in place to support a double bollard and bulkhead concrete pour



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Once the new bulkhead and bollards were placed, they needed to be secured. AB hired Nicholson Construction (Nicholson) as a subcontractor to take on this responsibility. Nicholson used a soil anchor installation rig for drilling anchors and grouting. During this process, several unforeseen obstructions were encountered and even made a redesign necessary at one location, but did not affect schedule.

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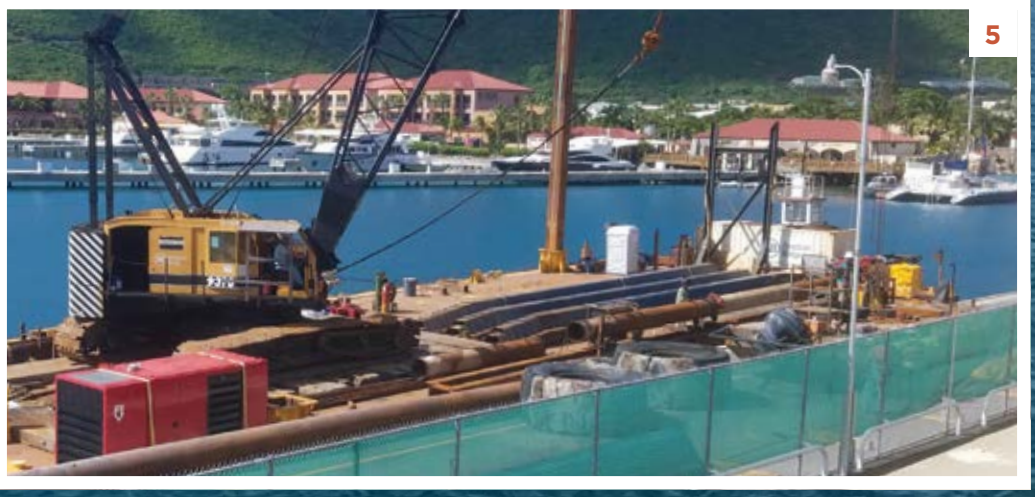
Photo 2: Cruise ship tying off to the newly installed SB-150 Bollards; Photo 3: Cruise ship tying off to the newly installed MT-150 Bollards; Photo 4: Looking east on the WICO dock as AB supports Nicholson (subcontractor) in drilling the holes for the permanent soil anchors



AB was also responsible for driving approximately 700' of sheet pile wall which was prefabricated and delivered to the project site. AB used a barge-based crane (American 9310) to move sheet pile onto the barge and then drive the sheet pile into the ground using an impact hammer. AB encountered a problem when the newly installed sheets at the beginning of the dock widening did not align with the existing sheet piles. After devising a plan with CH2MHILL, AB fixed this issue with a simple closure detail, attaching two pieces of plate steel to the existing sheet pile and the newly driven sheet pile. Then, a grout sock was put in place to fill the gap between each sheet pile wall, providing a barrier.

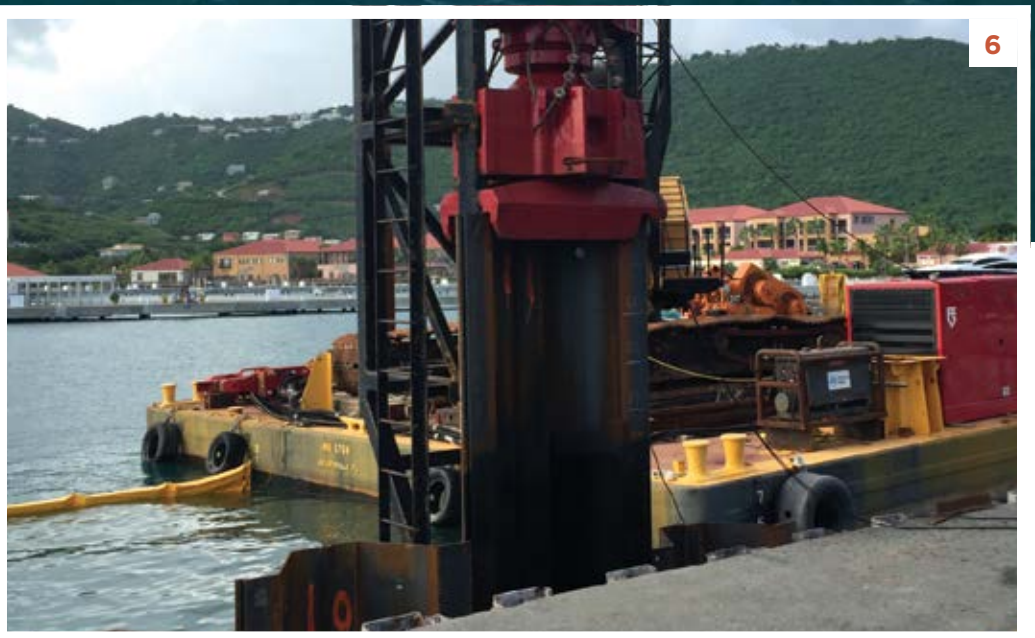


Photo 5: American 9310 moving sheetpile onto the barge; Photo 6: Impact hammer being used to push down a pair of sheet piles

WEATHER, ENVIRONMENT & SAFETY

Location, weather, and views are among the highlights of visiting the U.S. Virgin Islands. But with hot temperatures and the Atlantic Hurricane Season (June through November), construction projects can present dangerous conditions for workers. Luckily, the project site was not affected by any tropical storms or hurricanes while work commenced. Employees will also confess that the heat became oppressive at times, but they did not let it slow the field work down. Every day of the year temperatures on the island reach, on average, between 80°F and 90°F. Because of the constant high temperatures, AB continually communicated the importance of staying hydrated. AB bought water by the pallet and provided an ice machine for use on the jobsite. Canopy tents were also purchased to provide workers with relief from the sun while on breaks and while working in certain locations of the job. While weather was not an issue and had no effect on the project schedule, with a 100-year history, environmental issues were inevitable at the project site. The construction area was contaminated with old oil pipe lines and oil seepage areas. To prevent any environmental mishaps, AB maintained a clean-up prevention solution when drilling and excavating in the construction zone. Oil and other contaminants were disposed of and mitigated properly as the work progressed with no issues.

KEEPING UP WITH CAPACITY

As one of the busiest cruise ship ports in the Caribbean, it was important to WICO that the facility remained fully operational during construction. This meant three ships had to be accommodated at any given time. Work was scheduled on days that had the least amount of impact on vacationers, and when the maximum of three ships were on dock, work was suspended. Typically there was only one day a week that the port hosted three ships at one time. As to not disturb the normal operations of the dock, AB scheduled work around those days making it so the crew's "weekend" fell during this time.

This allowed workers to have full access to every part of the jobsite when active. Even with these provisions in place, less than a year after breaking ground on the project, work was completed. With 621' of new bulkhead, 700' of sheet pile wall driven, 28 new bollards, 38 new fenders, a 78' return wall, and three new marine cleats, the dock is now able to accommodate even the largest class of cruise ships. The owner expects that the entire restoration project will extend the life of the pier for at least another 50 years, making it possible for travelers to continue to visit the beautiful island of St. Thomas and enjoy the stunning destination.

*http://www.f-cca.com/downloads/2017-Cruise-Industry-Overview-Cruise-Line-Statistics.pdf

PRESERVING A CONNECTION

M48 Severn Bridge cable inspection crosses the finish line ahead of schedule

Location: South West, United Kingdom
Owner: Severn River Crossings PLC

VITAL

Cable-supported bridges are located all over the world. Most are found spanning bodies of water, making corrosion of the cables over time due to the earth's natural elements probable. To maintain their projected lifespan, inspections and upkeep is necessary. This complex craft is a unique challenge that allows American Bridge to continually develop specialized skills.

IN 2007,

AB handled the field construction aspects of a comprehensive inspection program for main and suspender cables for the George Washington Bridge in New York City. The project involved cable replacement and rehabilitation, cable wedging and inspection, and cable compaction and rewrapping. This marked the beginning of cable inspections for AB.

Fast forward to 2015, AB was awarded with yet another inspection project—this time in the United Kingdom. The M48 Severn Bridge is a 1960's suspension bridge that carries the M48 motorway across the River Severn and the River Wye connecting Aust, South Gloucestershire, England and Chepstow, Monmouthshire, South East Wales. The bridge has a 3,241-foot main span, and the total length of suspended spans is 5,249 feet.

AB was chosen to provide access and project management for the inspection of eight main cable panels on this bridge. The AB team had just what the owner, Severn River Crossings PLC (SRC), was looking for—experience with unwrapping and wedging cables, repairing broken wires, and using a wire compactor and wrapper.

The high level access platform on the M48 Severn Bridge

INSPECTION ACCESS PLATFORMS

Prior to the inspection, two access platforms—a Low Level (LLP) and a High Level (HLP)—needed to be designed and built. These platforms aided in the main cable inspection by allowing closer examination of the exterior of the cable. The HLP was used for the inspection of two high level main cable panels at different locations on the bridge. The LLP facilitated the inspection for the other six panels. As part of the contract, AB was responsible for the design, fabrication, installation, and operation of both.

The first step in the design was developing the Acceptance in Principle documentation (AIP) which then had to be accepted by the Owner's Engineer, AECOM. Then, with support from the supply chain, the requisite calculations and design drawings for the LLP were produced and a Designer's Risk Assessment, calculations, modeling, Failure Modes Effects Analysis, shop drawings and O&M Manuals were assembled for the HLP. Next, Design Certificates, Design Check Certificates and Construction Compliance Certificates in association with the project design team for both the LLP and HLP were produced. Finally, both platforms were Category 2 (CAT2) checked prior to final sign off and the HLP was also partially Category 3 (CAT3) checked by AECOM. CAT2 refers to structures that must have the design checked by a person who is independent of the design team, but may be from within the same organization. CAT3 means the design must be checked by someone completely separate from the organization.

Throughout the design process a number of innovations were developed. The LLP was a tube and fitting scaffold linked together by a bridge link walkway, which enabled the rapid deployment of personnel, equipment, and materials between scaffolds on adjacent cable panels. This resulted in much quicker delivery of the low-level works. The scaffolding had to satisfy various constraints to be able to do its job properly. It had to provide suitable access and egress to the main cable and be of suitable height to allow inspection around the full circumference of the main cable panels. As the scaffold intruded into the footpath/cycleway (which was used by all contractor vehicles) it also had to have enough clearance to allow vehicles past the scaffold once it was erected. The HLP was a custom-designed and fabricated gantry system. This design had to accommodate the movement of materials and equipment to and from the man riding access cradle.

Both platforms had to contain the lead dust generated when the external wrapping wire was removed from the bridge's main cables. They were designed with full sheeted containment to protect the bridge, traveling public, work force, and the wider environment. For the HLP this meant that the design had to include a permanently sheeted roof and retractable side curtains.

The M48 Severn Bridge is subject to powerful gusts and weather events, so a risk assessment matrix for high winds was established. The bridge is closed to all vehicles when winds reach 60 knots. Therefore, both platforms also had to allow for wind loading at maximum levels. For the LLP, AB worked with the subcontract scaffolder, SGB, to design the scaffold roof to withstand the highest levels of wind speed permissible in the existing design codes. The design was further revised at the request of Highways England and SRC to avoid removing the scaffold roof during moderate winds, which could risk delaying the project.

The occasional high winds at the project site made working on the platforms challenging and sometimes even impossible. However, AB planned for the

The high level inspection gantry ready to be delivered to the project site

"typical British weather" (as the locals call it), and created a flexible schedule. During these windy periods, work was undertaken either in the anchorages or on the LLP, preserving the schedule. With this foresight, weather did not impact AB's ability to complete the project on time.

Once the platforms were designed and fabricated, they were ready for installation. The HLP installation operation was an exercise in subconsultant and subcontractor coordination—all orchestrated by AB. To bring the operation under a single certifiable process, a custom Erection Scheme Certificate was developed in conjunction with AECOM. AB led the operation, supported by the designer, a crane supplier to lift the gantry to the trestles, and a specialist lifting company to hoist the gantry and secure it to the main cable. The certificate clearly defined all roles and responsibilities so they were understood and accepted by each party. The certificate was also used to confirm that the individual Risk Assessment Method Statements (RAMS) produced by each party were completed, checked, signed off and, most importantly, covered the relevant sections of work without leaving gaps in methods.

AB was also responsible for platform operations. AB adopted the Institute of Structural Engineers Purple Book (operation and maintenance of bridge access gantries and runways) as a guide to the successful training of operators, inspection, and maintenance of the gantries. This system, along with the designer's operation and maintenance manual, were used collectively on daily and weekly custom-made examination check sheets for the gantry throughout the project.

INSPECTION PROCESS

Next came the main event—the complete inspection of the eight main cable panels. An external inspection of the wrapping system of the cables was the first step. The inspectors examined the wrapping system by checking the cable for any visible abnormalities on the exterior, looking primarily for compromises in the protection of the wrapping. Inspectors were on the lookout for rust stains, beads of water, peeling paint, and cracks—all indications of a compromised wrapping system with potential water infiltration. Inspectors paid close attention at the midpoint of the mid span (the low point of the cable) due to its proximity to the roadway "splash zone" and the tendency of water to gravitate there.

During this process, the exterior was also documented and photographed as any irregularities and breaches in the wrapping system can explain some of the deficiencies within. The exterior inspection indicates where to open the cable for the interior inspection—a complex and detailed process.

Once the wrapping system inspection was complete, nine more major steps followed to complete the internal inspection. First, three, two-inch wide strips (three feet from each cable band and one in the center of the panel) of elastomeric wrap and wrapping wire was removed to gain access to the cable. Once this was completed, AB measured and recorded the existing cable diameter and circumference at each location for use during the re-compaction stage. These diameter measurements help to determine if the cable is properly compacted and that no abnormalities exist before and after removing and installing the wrapping wire. A varying diameter could become an issue at the end of the inspection during the compaction and wrapping of the cables.

Next, the circumferential wrapping wire was removed. The full sheeted containments on the platforms were essential at this stage, as the cable surface was cleaned with a wire brush and dust/debris were vacuumed up.

Then, the cables were wedged open at eight locations around the circumference at the positions shown in Fig. 1. The inspected panels were unwrapped from band to band to allow driving of the wedges to the required depth. A smaller brass wedge was initially used to open up the wedge line at the center of the panel. Then, pairs of full-size neoprene wedges were driven down into the cable, expanding the wedge

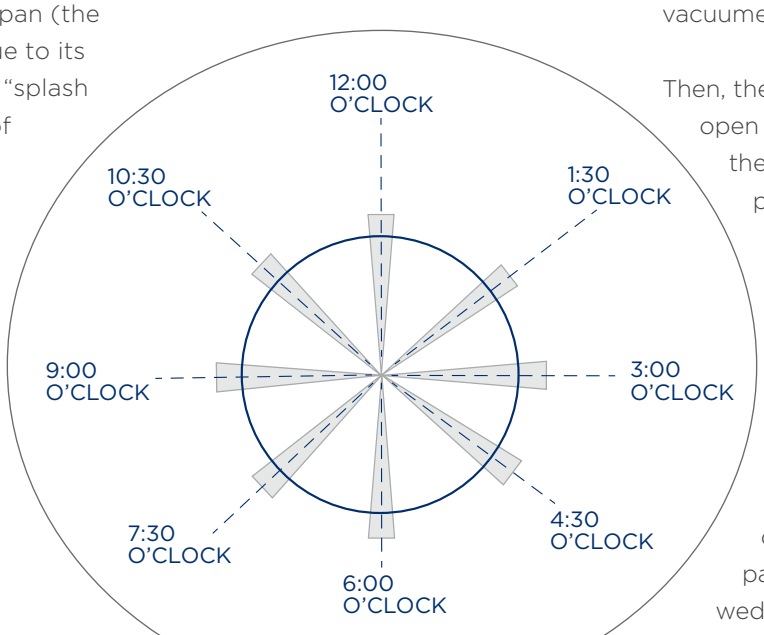


FIG. 1 WEDGING PATTERN

line towards the cable bands with the tips of the wedges eventually reaching the center of the cable.

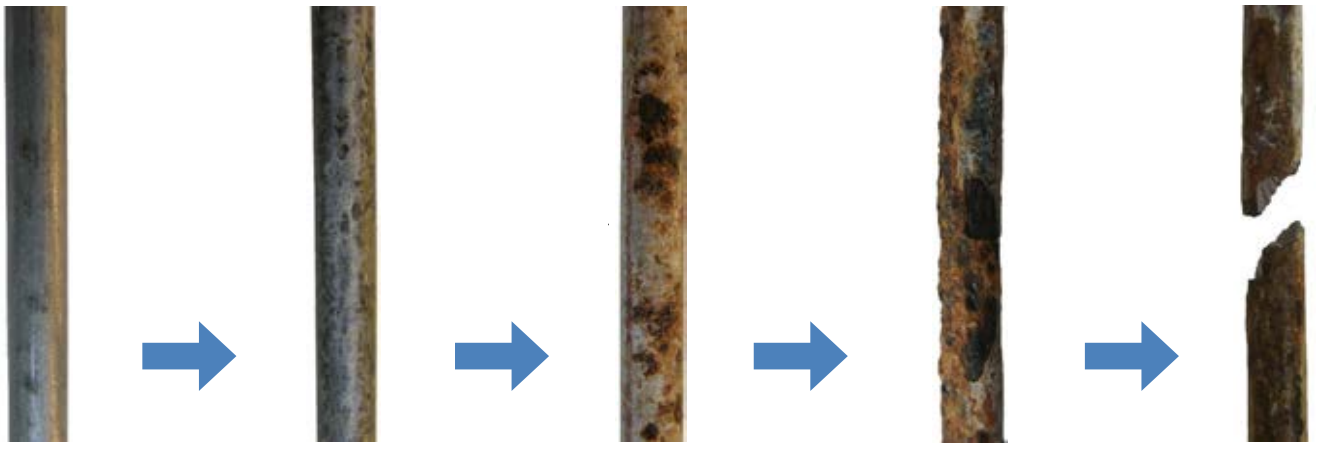
Wire conditions were then recorded at four locations along every wedge line. Each wire in the groove along the quarter length was rated in stages according to their corrosion level (Fig. 2).

Once the inspection and sampling was complete the cable was re-compacted. Cable re-compaction starts at one end of the cable panel and proceeds toward the other. SRC provided the compactor for the project, which was fully refurbished for the project by AB prior to use. The machine consisted of a segmented steel ring with four, 100-ton center hole hydraulic jacks operating simultaneously to constrict the ring. The jacks were equally pressurized through a manifold and a hydraulic pump was powered by compressed air. Compaction intervals and temporary sizing band spacing were determined in the field based on the degree of expansion of the cable after wedging. Cable circumference measurements were taken after pressurizing the compactor and after banding and releasing the compactor to monitor the relaxation of the bands. The new measurement was then compared to the original diameter to confirm it was not exceeded.

Prior to re-wrapping the cable with circumferential wrapping wire, an oil-based zinc paste was applied to protect the cables. Historically, waterproofing red lead paste was used for this, but because of environmental concerns, in the last few decades the switch to oil-based zinc paste was made.

The cable was first compacted and held in shape with stainless steel strapping. Then the wrapper was installed and wire wrap was applied simultaneously with the zinc paste. Each stainless steel strip was removed as the wrapping wire advanced. A custom machine was used to apply circumferential wrapping wire to maintain the cable's circular shape. The wrapping machine was electrically powered and driven and controlled by a Siemens PLC system. It consisted of two main parts—the saddle sat on top of the cable and acted as the base for the machine, and the flyer which housed the wrapping wire spools and rotated around the saddle. The machine was capable of winding the wires with a minimum tension of 300 pounds around the cable. The wrapping wire tension was maintained by torqueing the spool nuts, creating friction between the underside of the spool

FIG. 2 WIRE CORROSION GRADES



STAGE 1
No corrosion (spots of zinc oxidation)

STAGE 2
White zinc corrosion product present (on entire surface)

STAGE 3
Occasional spots of ferrous corrosion (up to 30% of surface)

STAGE 4
Larger areas of ferrous corrosion (more than 30% of surface)

BROKEN

Inspecting an open wedge line

The wire wrapping machine in action

Wrapping with D.S. Brown Cableguard Elastomeric Wrap

and a brake pad is attached to the surface of the flyer.

To improve safety and prevent manual handling, the team used a truck-mounted crane to load the wrapper and compactor at the yard and unload onto either the scaffold landing platform or the gantry cradle used to transport them to the high level gantry.

Once the wrapping wire was applied, the ends of the wire were soldered to prevent unwinding. Cableguard elastomeric wrap, provided by supplier D.S. Brown, was then applied to the cable. This was done by hand for uniform coverage and a triple overlap at the seams. AB used specially-made heating blankets, also supplied by D.S. Brown, to fuse the layers of overlapping wrap together to create airtight seals prior to the main cable dehumidification system reactivation.

The cables were then ready for the final step—painting. Traditionally, suspension bridge cables were protected with the same paint system used for the steel structure. However, AB used a water-based acrylic coating with highly elastic polymers that cures to a rubbery coating. This coating has seen increasing use recently because of its ability to sustain up to 200% elongation without cracking or peeling. In addition, these coatings have proven to have a long life in other applications, especially in environments similar to that of the M48 Severn Bridge where superior salt water and chemical resistance is necessary.

SAFETY

As with all AB projects, no matter the location, safety is always the number one priority. The staff on the M48 project went above and beyond to keep the employees, and the public, safe. Not only did the full sheeted containment protect the people and the environment from lead dust, but a lane closure was also in place any time work was being done on the cable. AB hired a local company to carry out the traffic management. There were also three complete closures over the weekends when the high-level gantry was being installed, moved, and removed. This schedule allowed AB to safely perform critical operations while minimizing effects on traffic.

Speeding cyclists on the bridge's foot/cycle path also created a safety hazard to workers. To prevent collisions, AB set up an alarm system using an infrared beam. This system alerted workers when cyclists were in the active work zone, giving employees time to take precautionary steps to avoid being hit.

AB wrapped up work in December 2016, driving the project to the finish line two months ahead of schedule, significantly reducing the required traffic management and impact on the local community. This was especially important for Highways England, who had been placed under pressure to finish ahead of Network Rail's closure of the adjacent Severn Railway Tunnel for major maintenance in September 2016. The early completion of works and lifting of traffic management restrictions allowed unhindered passage of train replacement coach services over the bridge.

The M48 Main Cable Inspection project typifies a success for AB: a safe project, delivered ahead of schedule to a satisfied client.

The gantry being installed in a full closure

FEATURED EMPLOYEE

JOSH PERRY

PROJECT MANAGER – DELAWARE MEMORIAL BRIDGE DEHUMIDIFICATION

Meet Josh. Josh has been with AB since 1998 when he began his career as an intern on the Providence Place Mall project (AB Order No. 471210). Since then he has worked his way up through the ranks as a Field Engineer, Project Engineer, and Project Manager on large and complex projects, primarily in the New York City area. He is currently the Project Manager on the Delaware Memorial Bridge Dehumidification, leading the efforts to complete the dehumidification of main cables on both the first and second structures of the bridge.

Your father was an ironworker—is that why you became interested in the construction industry?

Absolutely! Growing up, I was fortunate to have a father who led by a positive example. He lives a life of reliability, is hard-working, courageous, and embodies a "take-on-anything" attitude. During his career as a Local 37 Ironworker, he helped build bridges, high-rises, and everything in between. He built the home where my brother and I were raised, started a small business, and wrenched on muscle cars during the weekend. Every step of the way, he showed me how to be inventive and work safely with my own two hands. I grew up spending a lot of time with my dad in our garage, which was my favorite place to be. I had free reign to work there, and I spent many hours designing and creating all sorts of things. This has given me a strong knowledge of general construction and a practical sense of how things that I use every day on the job work.

You have been with AB since 1998, when you interned with the company. What has kept you returning project after project?

I continue to be marveled by AB's positive reputation. I meet new Ironworkers on every project, and there are always shared stories of uncles, fathers, and grandfathers who once worked for AB. You'd be amazed that the one thing our Ironworkers love getting most when signing up, is an AB hardhat sticker. Hardhats are not just for safety when it comes to Ironworkers. Their hats reflect who they are—they're all unique and provide a glimpse into their individuality. Adding that AB sticker gives them "bragging rights" to say they've worked an AB job. I can't quite imagine any other heavy civil contractor out there having nearly the same historical influence as AB. Being part of that heritage and helping to further AB's longstanding reputation is what keeps me here—not just the sticker I got when I signed up!

Your work has mainly been focused in New York City. Do you enjoy working in one of the country's busiest urban areas? Does this make the experience different?

The New York metropolitan area has been very good to me. Reflecting on my time here, the challenges I faced when working with such a strong Union presence in a fast-moving city has been invaluable. There are a lot of folks who want nothing to do with work or life in "The Big City" and believe it is a bad place - and avoid it at all costs. By doing so, they are limiting the experiences and personal growth a world-class city like New York can provide. In some strange way, knowing how intimidating this city can be has fueled me to thrive where many are hesitant to even visit. It sure was nerve-racking for me to come here as a shy 22-year-old kid from a small corner of Rhode Island. By facing that uncertainty, even if it meant acting confident on the exterior, I put myself in situations that helped me grow in ways I never thought possible, and I wouldn't have it any other way.

What is a typical day like for you?

Just about every day I encounter new experiences. There are countless learning opportunities if you seek them out because this industry is so dynamic, with many different personalities, and is ever-changing. This makes my typical day rather atypical and that helps keep me motivated. I've also seen my daily routines change for each project I'm part of. No two jobs are the same, and no two teams will ever be the same as each of us have different levels of experience, strengths, and vulnerabilities.

Being in Delaware this past year, I've had to commute a short distance to-and-from northern New Jersey. This changed my routine more than ever as I spend nearly four hours a day traveling, two or three days a week. I'm no longer the first one in the office or the last one to leave. This challenged me to become a more effective communicator along with learning to better delegate authority, provide support and guidance to our team, and to trust others more. Everyone knows that if they want something done correctly, they need do it themselves, right? Not at all. I've learned how damaging a mindset this can be. You're not only limiting the possibilities of your job, but more importantly hurting those around you by not letting go and building them up instead.

What is your favorite project you have worked on so far at AB?

Without hesitation, it was the George Washington Bridge Span Upper Level Structural Steel Rehabilitation, (AB Order No. 415110) from 2011 - 2015. This was by far the most demanding project for me and was by no means a glamourous one. We self-performed nearly 630,000 manhours and supervised nearly 100,000 more subcontractor hours during two shifts with a team of about four engineers, one Superintendent, and Kwadwo's (AB Vice President) support. Yet we walked away completing a very successful project. I'm sure the other staff would agree this was a huge challenge that was daunting at times, but looking back on it, it is one I'll never forget. I most value the skills I learned as a first-time Project Manager, and how I quickly realized the importance of building and maintaining a cohesive, collaborative team. As a manager, if you don't sincerely value, support, and direct those working alongside you, you are severely limiting the results your project can achieve. I believe it's as simple as that.

You were one of the AB employees that went to Nicaragua in 2015 to build a footbridge with Bridges to Prosperity (B2P) (AB Connections Issue #1004). What was that experience like? What moments stand out to you?

This was a once-in-a-lifetime opportunity and I feel very fortunate to be part of AB's first B2P group. It was not a vacation by any means (I'm talking to you, Panama crew!). We worked long, 10 hour days for nearly two weeks straight while cohabitating with farm animals.

I recall the collective mood of the group was not so cheerful in the beginning of the journey. Yet as each day passed and we met more of the locals, you could see excitement grow as the bridge started to take shape. To see firsthand how much this simple crossing meant to the community (on levels I can't even fathom), I learned a lot about the value of helping others and how to appreciate the safety, security, and opportunities we have in the US. All the challenges we faced, mixed with admiration from the locals, culminated during the bridge inauguration when I watched these folks cross the bridge for the first time. Understanding how this footbridge improved their livelihood overnight imparted in me a strong sense of pride for what we accomplished. This was an experience I'll never forget and I'm grateful to AB for giving me the opportunity to be part of it.

If you could have worked on any AB project since our inception in 1900, what would it be and why?

I would have chosen the Lions Gate Suspended Span Replacement (AB Order No. 790110) in Vancouver, British Columbia, Canada. First and foremost, it's a world away from New York City! This project was the first of its kind and an amazing feat on many levels. The legacy of that project has paved the way for the recent Angus L. Macdonald Bridge rehabilitation which was the second undertaking of this kind, and AB's second go at it as well. Job well done to the AB crews that worked on these projects.

What would we find you doing outside of work?

I enjoy woodworking, exercising, playing guitar, golfing, and hiking, and lately you'll find me spending a lot of time with my wife, Dana, and our 8-month-old boy, Jack. When he looks me square in the eyes, stares for a few seconds, then cracks a smile out of the corner of his mouth and laughs... it is absolutely infectious!

NEW EMPLOYEES

Shawn Conway EHS Manager I, Peace Bridge Rehabilitation (US)

Laura Dent Field Engineer

Robert Dickinson Field Engineer, Peace Bridge Rehabilitation (US)

Jeremy Drover Field Specialist, Peace Bridge Rehabilitation (Canada)

Robert Easterbrook Network Technician I

Diego Laris Project Engineer, Coco Cay Pier Development

Timothy Lindstedt Project Superintendent, Coco Cay Pier Development

David Mondragon Project Engineer, Tampa, FL

David Nagy Project Engineer, Tappan Zee

Denisse Paez CAD Drafter/Designer, Tappan Zee

Aaron Patton Field Engineer, 10th Street Bridge Rehabilitation

Jordan Penney Field Specialist, Peace Bridge Rehabilitation (Canada)

Thomas Pianko Treasury Manager

Cedenyo Pratt Project Engineer, Coco Cay Pier Development

Adam Reichard Field Engineer, Tappan Zee

Brandon Rosado Senior Estimator, Ft. Lee, NJ

Alan Salazar-Rosales Field Engineer, BNSF RR

Jonathan Yates Project Manager, Tampa, FL

NEWS + ACHIEVEMENTS

- Kevin Smith, Chief Engineer - West presented an overview of the erection challenges and solutions on the Angus L. Macdonald Bridge Suspended Spans Deck Replacement project at the Structural Engineers Association of Illinois' Annual Bridge Conference in Chicago in April.

- Mike Flowers, retired President and CEO of AB, was named a Distinguished Alumni at the Swanson School of Engineering – University of Pittsburgh where he earned a Master of Science in Civil Engineering.

- The Queensferry Crossing is officially open! On August 30th, the first car traveled over the bridge and five days later on September 4th the ribbon cutting ceremony marked the official opening.

- On August 26th, Rockland-bound traffic on the existing Tappan Zee Bridge was officially shifted over to the first span of the new 3.1 mile, parallel, cable-stay crossings of the Hudson River. The second span will be connected to land and fully functional in 2018.

- Nathan Flowers, Safety Manager, was selected by the National Safety Council as a 2017 Rising Star of Safety. He was selected from over 100 nominees to be a member of the 2017 Class for his efforts on the Tappan Zee Hudson River Crossing.

CURRENT CONTRACTS

- **Explosives Handling Wharf #2** Silverdale, Washington
- **Horseshoe Arch Pedestrian Bridge** Dallas, Texas
- **Blount Island Marine Terminal Wharf Reconstruction** Jacksonville, Florida
- **Portageville Bridge Replacement** Portageville, New York
- **Queensferry Crossing** Edinburgh, Scotland, United Kingdom
- **Angus L. Macdonald Bridge Suspended Spans Deck Replacement** Halifax, Nova Scotia, Canada
- **The New NY Bridge (Tappan Zee)** Tarrytown, New York
- **Delaware Memorial Bridge First and Second Structures – Dehumidification of Main Cables and Anchorages** Wilmington, Delaware
- **Inner Berth Bulkhead Improvements and Bollard Replacement** St. Thomas, U.S. Virgin Islands
- **BNSF Truss Bridge Over I-235** Oklahoma City, Oklahoma
- **WV Corridor H – Kerens to U.S. 219** Tucker/Randolph Counties, West Virginia
- **Peace Bridge Rehabilitation** Ft. Erie, Ontario, Canada
- **Edmonton Valley Light Rail Tawatina Bridge** Edmonton, Alberta, Canada
- **Tacony-Palmyra Bridge Mechanical Rehabilitation** Palmyra, New Jersey
- **Coco Cay Pier Development** Little Stirrup Cay, Bahamas
- **Crown Bay – Mooring Dolphin** St. Thomas, U.S. Virgin Islands
- **10th Street Bridge Rehabilitation and Cable Dehumidification** Pittsburgh, Pennsylvania
- **Tintagel Castle Footbridge** Cornwall, United Kingdom
- **Tamar Bridge Suspension System Remedial Works** Plymouth, England, United Kingdom
- **Wharf Bravo Structural Repairs** Naval Station Guantanamo Bay, Cuba
- **Union Pacific Railroad Lift Bridge** Angleton, Texas

PROJECT WINS

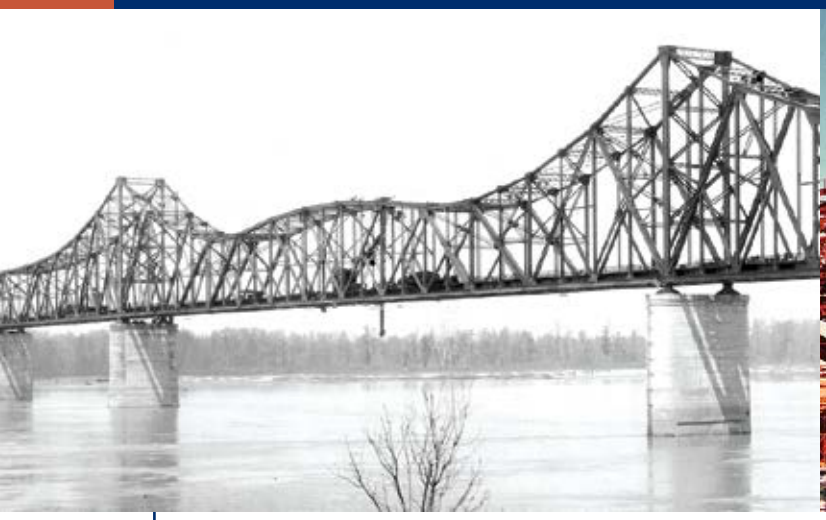
TINTAGEL CASTLE FOOTBRIDGE
Cornwall, United Kingdom

TAMAR BRIDGE SUSPENSION SYSTEM REMEDIAL WORKS
Plymouth, SW England, United Kingdom

WHARF BRAVO STRUCTURAL REPAIRS
Naval Station Guantanamo Bay, Cuba

UNION PACIFIC RAILROAD LIFT BRIDGE
Angleton, Texas

FLASHBACKS



VICKSBURG BRIDGE

Location: Vicksburg, Mississippi
Completion Date: 05/01/1930
AB Order #: F-6301-8

87 years ago, AB completed the construction of the Vicksburg Bridge, an 8,546' cantilever truss bridge, in just over one year. AB was the general contractor for this combined highway and railway bridge that spans the Mississippi River connecting Vicksburg, Mississippi and Delta Point, Louisiana. The bridge is now closed to vehicular and pedestrian traffic, but it is still in use by Kansas City Southern Railway.

JOE LOUIS ARENA

Location: Detroit, Michigan
Completion Date: 05/19/1979
AB Order #: K-7191-98

In 1979, AB completed work on the Joe Louis Arena in Detroit, Michigan. This multi-purpose arena is 441' by 326' with a roof system that is framed by two main trusses 40' deep by 441' long. The Detroit Red Wing's tenure at "The Joe" came to a close this year (2017) after calling the arena home since its opening. This arena is the second-oldest building in the National Hockey League, and has also been used for other various events throughout the years such as concerts, basketball games, and figure skating competitions.

MT. HOPE SUSPENDER REPLACEMENT

Location: Bristol, Rhode Island
Completion Date: 11/01/2003
AB Order #: 421210

AB completed the suspender replacement on the Mt. Hope Bridge, a crossing of Mt. Hope Bay in Bristol, Rhode Island, 14 years ago. AB was responsible for the removal and replacement of 109 pairs (218 total ropes) of 1⅜" diameter wire rope suspenders which varied from 11' to 253' in length. Work also included lead paint removal and new painting at the socket areas and cable bands and area painted prior to installing the new suspenders.

GARY REFUSE CONVEYOR BRIDGE

Location: Gary, West Virginia
Completion Date: 07/01/1982
AB Order #: J-3012-16, C-7692

AB completed a main cable and suspender rope replacement on the Gary Refuse Conveyor Bridge 35 years ago. This 4-span 1,117' suspension bridge carries a mine refuse conveyor for the U.S. Steel Mining Company. Not only did AB complete the replacement, but all the design work for the project was also performed in-house by AB's engineering department.

STANDING ALONE

Early 1900s AB construction plan unique to this day

Railroad bridges make up a significant part of AB's history dating all the way back to the early 1900s, shortly after incorporation. During AB's early years, the Cincinnati, New Orleans, & Texas Pacific Railway, part of the Southern Railway System, enlisted AB to complete a unique railroad bridge project.

Prior to the AB-built Kentucky River High Bridge, another railroad bridge of the same name stood in the same location in 1877. This railroad bridge served as a part of an important thruway for trains that stretched all the way from Cincinnati, Ohio down to Chattanooga, Tennessee. This bridge, as a critical link in the route, was in need of a total replacement.

In October 1909, AB began the construction for the new Kentucky River High Bridge. This crossing of the Kentucky River between Jessamine and Mercer counties was to be a double-track deck truss, three by 353' on 160' towers. But because of the bridge's importance, the construction posed an interesting question. How would it be possible to keep this bridge in service while building a replacement in the same exact location? Closing the bridge was not an option. So, in order to make this possible, the new bridge was built completely surrounding the active iron structure—creating what was essentially a bridge within a bridge. A little less than three years

NORFOLK SOUTHERN KENTUCKY RIVER HIGH BRIDGE

Location: Jessamine/Mercer Counties, Kentucky **Completion Date:** 07/23/1912 **AB Order #:** B-5360-2

after the start of construction, the bridge was completed in July 1912.

The new bridge towers surrounded the old ones and the new truss was 73' high—31' taller and wider than the 18' wide original—and the bridge deck was 280' above normal water elevation. It was once the highest railroad crossing in the world, as well as the highest bridge in North America. These records have since been surpassed, but this was an incredible feat for the time.

Both bridges coexisted for 18 years, but in 1929 the old bridge was removed and a second set of tracks was added to the AB-built structure. 56 years later, in 1985, the bridge was deemed a National Historic Civil Engineering Landmark by the American Society of Civil Engineers, who noted the project as one that "illustrates the creativity and innovative spirit of civil engineers" as well as an "achievement of what was considered an impossible dream".

Today, the bridge has a different owner after the Southern Railway merged with Norfolk and Western Railway in 1982 to form the Norfolk Southern Railway. But this impressive structure, even after over a century of service, continues to provide a vital passage between Lexington and Danville, Kentucky.

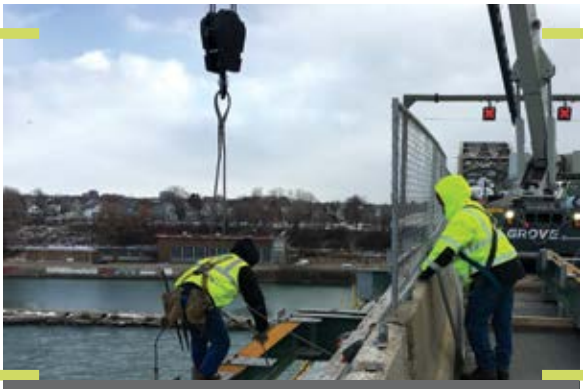
CAPTURING SAFETY WEEK 2017

Every year, Safety Week is held across the heavy civil construction industry. It's an opportunity to reexamine and reinforce that safety extends well beyond the jobsite. This year, Safety Week took place from May 1st through May 5th. To pay homage to Construction Safety Week, AB was once again a sponsor. With a different theme every year, the week-long event turns into a chance to gain new knowledge on diverse safety topics. 2017's theme focused on hand injuries, hazards, glove types, teamwork and incident response, and first aid.

In line with AB's traditional Safety Week practices, employees at each jobsite and office signed banners to symbolize their commitment to safety, and training sessions were also held. But while safety is a serious topic, AB always likes to have a little fun along the way. This year AB decided to throw a twist on the week. The days were filled with engaging activities for employees to participate in such as trivia and photo contests. These contests served to raise awareness within the company—while learning some helpful safety tips along the way (and also a chance to win some great AB gear!)

Safety Trivia Winners were Kevin Smith, Chief Engineer - West, Scott Swamback, Project Engineer on the Portageville Bridge Replacement, and Dan Murphy, Senior Project Manager on the 10th Street Bridge Rehabilitation and Cable Dehumidification project. ✦

safetyweek snaps



Fascia Stringer Erection CAS

Ironworkers from Local 6 Buffalo erecting steel over the Niagara River at the Peace Bridge project using appropriate fall protection and PPE, with a dedicated signal person for the crane; Photo Credit: Cory Sutherland, Field Engineer

Tappan Zee

Ironworker setting a precast deck panel on the Tappan Zee Bridge using a tag line to control the load as well as utilizing a Garlock safety guardrail at the leading edge; Photo Credit: Andre Markarian, Engineer - Main Span

Check out the live FalconCam!
www.newnybridge.com/falcon-camera

NESTING OVER THE HUDSON RIVER

Local celebrities get special consideration

When building new construction projects, or rehabilitating existing structures, AB's safety polices extend beyond the workers and the traveling public. Back in 2014, AB staff built a platform for osprey to make a nest on at the Coosa River Bridge project (AB Connections Issue #1001). This time around, Tappan Zee Constructors, a joint venture that includes AB, had to accommodate some local celebrities—a family of endangered peregrine falcons.

For decades, the falcons have been returning to the man-made nest box that sits high atop the existing Tappan Zee Bridge. This box, maintained by the New York State Thruway Authority, provides shelter for the falcons, and also serves as a high vantage point from which to hunt.

Even with ongoing work on the new Tappan Zee Bridge, the falcons haven't strayed far. To protect the endangered species, the project team placed a 100' construction-free buffer zone around the box. Because of these measures, the falcons have been unaffected by the current construction and continue to return, especially during nesting season in the spring. This past April, two baby falcons (known as eyases) were hatched in the man-made nest box. Local schools were invited to help name the new Tappan Zee Bridge residents. Suggestions were shared by classes and then the public voted on their favorite options. The chosen winners were Puente (Spanish for bridge) and Tarrytalon (combination of the bridge location, Tarrytown, and the name for a falcon's claws). Once construction is complete on the new Tappan Zee Bridge, a nest box will be placed at the top of the new 419' towers, as to not dislocate the birds.

The project team has not only taken measures to protect wildlife, but they have also reduced other environmental impacts associated with the project, including the use of equipment that requires less dredging, smaller pilings, and the extensive use of clean fuel technology.

As a commitment to leave everything better than when we arrived, AB will always consider unconventional stakeholders just like this family of falcons.

AB CONNECTIONS

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