AB CONNECTIONS

Fall 2016 - Issue #1005

BORN A BUILDER:

President and CEO Michael Flowers is retiring after a career of engineering, constructing, and leading

HISTORY IN THE MAKING (AGAIN)

The Big Lift Brings Big Changes to Macdonald Bridge

Cover: Angus L. Macdonald Bridge | Halifax, Nova Scotia

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AMERICAN BRIDGE CONNECTIONS
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American Bridge

HISTORY IN THE MAKING (AGAIN)

The Big Lift Brings Big Changes to Macdonald Bridge

Photo credit: Lynn Fergusson

American Bridge Canada Company (ABCC) is well underway with the Angus L. Macdonald Bridge Suspended Spans Deck Replacement project in Halifax, Nova Scotia, known locally as "The Big Lift." Continuing the tradition of challenging and unique projects, ABCC is performing a complete replacement of the bridge's suspended spans—while keeping it operational. The only other time this type of project has been completed was nearly 15 years ago on the Lions Gate Bridge in Vancouver, British Columbia—also by ABCC. Lessons learned from ABCC's success on the Lions Gate Bridge Project provided valuable insight and aided ABCC's engineering and design efforts for the Angus L. Macdonald Project.

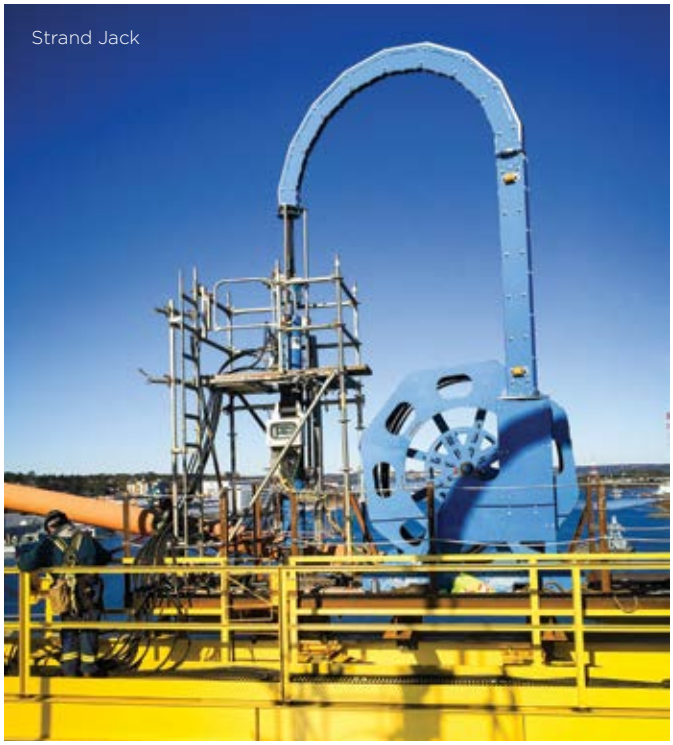
The work for this 762 meter suspension bridge involves the replacement of the superstructure in 46 segments; eight on the Dartmouth Side Span, 22 in the Main Span, and 16 on the Halifax Side Span. In addition to the superstructure replacement, the work also involves the replacement of many other components of the bridge including cable band bolts (also known as waisted rods due to the reduced diameter 'waist' between the threaded zones), traction rods, certain cable bands, all joints and bearings including pendulum and rocker link truss end supports, and all 148 suspender ropes. Modifications to the main towers and the cable bents, as well as the addition of new main cable handstrands and a cable dehumidification system are also work items included in the project scope.

Following a best value competition for the design-bid-build project, ABCC began construction engineering work in April 2014 and signed the contract with The Halifax-Dartmouth Bridge Commission, doing business as Halifax Harbour Bridges (HHB), in September 2014. Today, ABCC continues to work closely with HHB, COWI (the owner's lead engineer), and the owner's project management consultant, Colliers Project Leaders, to deliver a successful project.

PLANNING AND ENGINEERING

Replacing existing through truss bridge segments with new orthotropic deck segments and restoring the structure for traffic after every replacement closure requires sophisticated temporary works designs and detailed procedures. The contractual structure of this project is different than most. HHB's team not only designed the permanent structure, but also performed the construction analysis for each of the 46 segments to be replaced and HHB's team also designed a significant portion of the temporary works. This analysis was completed during the pre-bid phase and was based on assumed weights of equipment. From this analysis, HHB provided the design criteria for ABCC to design some of the temporary works and HHB prescribed some of the construction means and methods. The construction analysis also revealed the existing bridge's sensitivity to weight increases. Therefore, the temporary works designed by ABCC needed to meet the specified strength requirements without exceeding the weight limits assumed during the pre-bid analysis.

Designs for most of the temporary works that affect the structure when in use by the public were provided by HHB. These included the Temporary Deck Connection (TDC), a specialized piece of equipment that connects the newly erected deck segment and the existing bridge deck, the Erection Gantry which lowers and lifts the deck segments, and the Temporary Hanger Extension, an adjustable link between the sockets on the existing hanger ropes and the new bridge deck. ABCC performed constructability reviews on this equipment and completed the designs by adding access and other necessary features. ABCC also had design responsibility for lifting hitches, stringer support beams, access travelers, temporary wind bracing, temporary traffic plates, transition barrier rail, span jacking equipment, strand jack lifting equipment, marine equipment, and all erection procedures. These designs and procedures were prepared by ABCC's in-house engineering staff and engineering sub-consultant, Zieman Engineering.



Strand Jack

Klohn Crippen Berger provided independent check engineering as well as other design support.

The strand jack system used by ABCC for lifting and lowering deck segments 50 meters to the water included tandem motive units (TMU) developed by Vorspann Systems Limited (VSL). Each TMU strand jack consists of two, 84-ton capacity strand jacks stacked one on top of the other to allow continuous movement of the lift. As one strand jack is lifting, the other is retracting. Compared to a traditional single strand jack system, the tandem arrangement yields faster lift speeds, reduced impact loads, lower hydraulic fluid flow rate, and built-in redundancy. This unique equipment was successfully used for all of the Dartmouth Side Span and Main Span segments over water.

Because the Halifax Side Span is over land, ABCC designed a lifting system to perform the replacement. This system utilizes two, 50-ton chainfalls with a lifting frame and 120-ton swivel. The lifting frame is designed to be adjustable using a series of linear actuators to account for variations in the center of gravity of the new and existing segments in the span. The lifting frame is also capable of tilting the segments to facilitate

Barge Arrangement

alignment of the new deck segment splice. The Halifax Side Span lifting equipment is supported from the typical 20 meter long erection gantry, which allows two segments to be replaced from one erection gantry location—significantly accelerating the work.

Another critical design for the completion of this work is the marine fleet used to transport segments across Halifax Harbour from the fabricator's facility to the bridge. The **Abys** positioning barge is a 12.2 meter by 42.1 meter deck barge and includes two spuds and four anchor lines to locate and hold the barge steady. The **Timberland** is a 24.9 meter by 44.2 meter catamaran barge consisting of twin deck barges welded side by side. The **Timberland** barge has been outfitted with two ABCC-designed barge support frames to carry both new and existing deck segments. The barge support frames are elevated structures with support beams cantilevered six meters over the port side. The starboard side of the **Timberland** is ballasted to minimize list of the barge.

During a typical segment replacement, the **Timberland** is secured to the **Abys** and positioned below the erection gantry for receiving existing segments and delivering new ones. Marine support including tugs is provided by a local RMI Marine. The fabricator, Cherubini Metal Works located in Dartmouth, Nova Scotia a few miles from the bridge, loads the new segments on the supply barge at their wharf.

After all of the temporary works were designed, the final equipment weights were provided to COWI and the global staged construction analysis was confirmed. From this, ABCC prepared the segment replacement erection procedures. During and immediately after segment replacement, ABCC surveyed the geometry of the bridge and measured hanger forces near the erection front. This real-time data was provided to COWI for calibration of their global bridge model. Any differences from the previously calculated values were provided and incorporated into the hanger jacking adjustments for the next segment replacement.

To provide safe access for work on the main cables, ABCC also designed a Cable Access Crawler. The Cable Access Crawler is a steel framed two-sided pony truss, long enough to span the distance between two cable bands. The double trusses provide access to each side of the main cable. The crawler is supported by the main cable on either fixed or sliding supports at each end. Each support can be raised or lowered using hydraulic jacks. To traverse up or down the main cable, the crawler has been equipped with a traction winch mounted at the downhill end of the crawler. After the winch line is secured to the uphill cable band, the end reactions are transferred from the fixed supports to the sliding supports. Then, using the traction winch, the crawler can be moved uphill or downhill in increments of up to 1.7 meters. When the movement step is complete, the fixed supports are then extended and the sliding supports retracted and repositioned. The process is repeated until the crawler has been advanced approximately 10 meters to the next cable band. The Cable Access Crawler has been designed for waisted rod installation, new main cable hand strand installation, hanger rope replacement, and main cable dehumidification.

Cable Access Crawler

PREPARATORY STRENGTHENING WORK

In March of 2015, when the planning was complete, engineers were on site, ready to start construction. The first task to tackle was strengthening work which is separated into two categories— temporary or permanent—both ongoing activities throughout the duration of the Project.

Temporary preparatory strengthening is required on the existing suspended structure to support the increased demands of the construction process. Additional strengthening is incorporated into the diagonals of the suspended stiffening truss. Doubler plates (cheek plates) are welded onto the bottom chord to support the transferred demands from the TDC. As construction advances, the TDC rolls along the underside of the existing structure utilizing the bridge maintenance traveler rails to move to the next splice location. The existing bridge maintenance traveler rails were designed to support a much lighter load as the maintenance travelers weigh significantly less than the 34 ton TDC. Therefore, suspension rods and support lugs were added to the traveler rail to support the TDC by transferring the loading into the stiffening truss.

The permanent preparatory strengthening is installed to support the new loads of the permanent structure and to improve the design life of the completed support structure. This reinforcing also remediates deteriorated steel from the past 60 years of service. Strengthening work involves replacing diagonal members and reinforcing horizontals in the cable bents to support the weights of the new suspended structure. Splices in the tower legs are also reinforced to support the new weights and improve the design life of the components. Lastly, bolts in the cable bands are replaced with new waisted rods to increase the clamping force of the cable bands on the main cable and to support the new loads that are suspended both permanently and during construction.

Erection gantry with tandem strand jack system connected to hangers and ready for public traffic

MAINSPAN AND SIDESPANS (DARTMOUTH & HALIFAX)

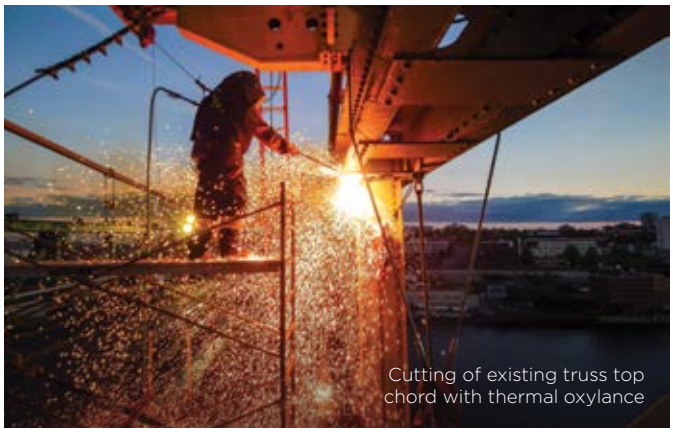
The main objective, and the reason for all of the preparatory strengthening work, is the replacement of the three suspended spans on the bridge—the Dartmouth Side Span, the Main Span, and the Halifax Side Span. The bridge deck is supported by an above-deck pony truss supported by hangers from the main cable, which is in turn supported by two cable bents and two main towers. Each of the existing spans are three lanes wide, with the Dartmouth Side Span and Main Span passing over Halifax Harbour, and the Halifax Side Span above the Canadian Department of National Defense's naval base.

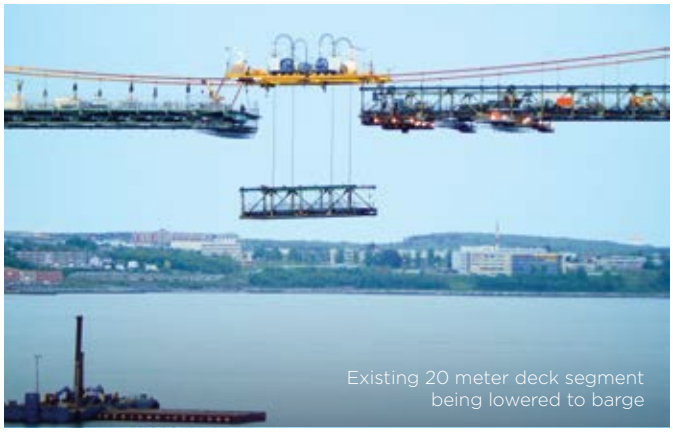
During weekend full-bridge traffic closures, 10 and 20 meter sections of the existing deck and truss are removed and replaced with a new orthotropic deck and truss segment. An erection gantry, which sits above the traffic envelope and remains on the bridge when open to the public, is connected to the hangers and is used to lower the existing segments and lift the new ones. The process for replacement is the same for the Dartmouth Side Span and the Main Span, as both are above water, and are replaced in 20 meter segments. At the beginning of each bridge closure, the existing deck is connected to the erection gantry with TMU strand jack assemblies. Once the 125-ton existing segment is supported by the erection gantry, it is disconnected from the previously erected new segment and hangers, and cut with a thermal oxylance. After the existing segment is cut free, it is lowered with the TMU's to a waiting barge. The strand jacks are then

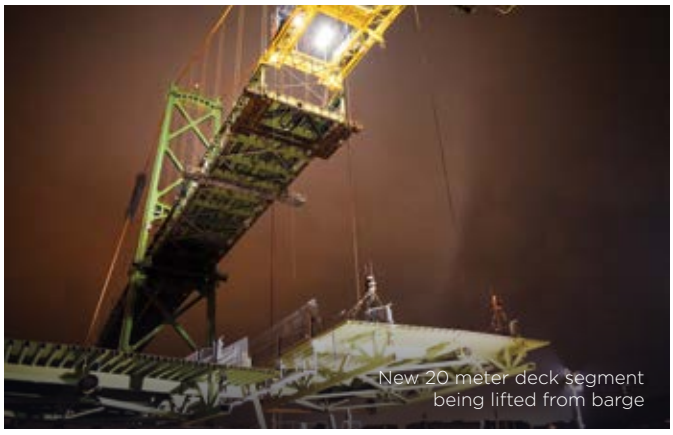
disconnected and hitched to the new 145-ton segment, which is lifted into place. The new segment is then bolted to the previously-erected segment on one end and a temporary connection between the new deck and the bottom chord of the existing truss on the other to carry traffic loads. A threaded rod jacking assembly is installed between the new deck and the hangers to allow the hanger loads to be adjusted to accommodate traffic. Between segment replacements, the erection gantry is disconnected from the hangers, driven ahead to the next location, and reconnected to the hangers.

The replacement of the first segment took over sixty hours to complete, and the replacement of the second segment took over forty. But with the hard work and dedication of the project team, ABCC, HHB, and COWI came together to improve the segment replacement process. Innovations included advances to the strand jack connections to the existing deck, modifications to the temporary deck segment connections, refinement of the hanger adjustment process, and improved efficiency of the steps in the replacement sequence. As a result, segments are now regularly replaced in under ten hours and in groups of two during a single weekend closure.

Beginning in the late fall of 2016, segment replacement on the Halifax Side Span will commence. Because this span is over land and not water, the process used for the Dartmouth Side Span and the Main Span must be altered to accommodate the different surroundings. Since the segments cannot be lowered to the ground, the existing deck and truss will be removed in 10 meter segments. These segments will be lifted and rotated 90 degrees before being transported off the bridge. The new 10 meter segments will be transported onto the bridge and turned 90 degrees before being lowered to their final position. The erection gantry will be modified to accommodate the shorter and lighter segments. As previously noted, pneumatic chain-falls and a 120 ton swivel will provide the lifting, lowering, and rotating required, and will be able to replace two, 10 meter segments from the same location in a single weekend closure.


Cutting of existing truss top chord with thermal oxylance

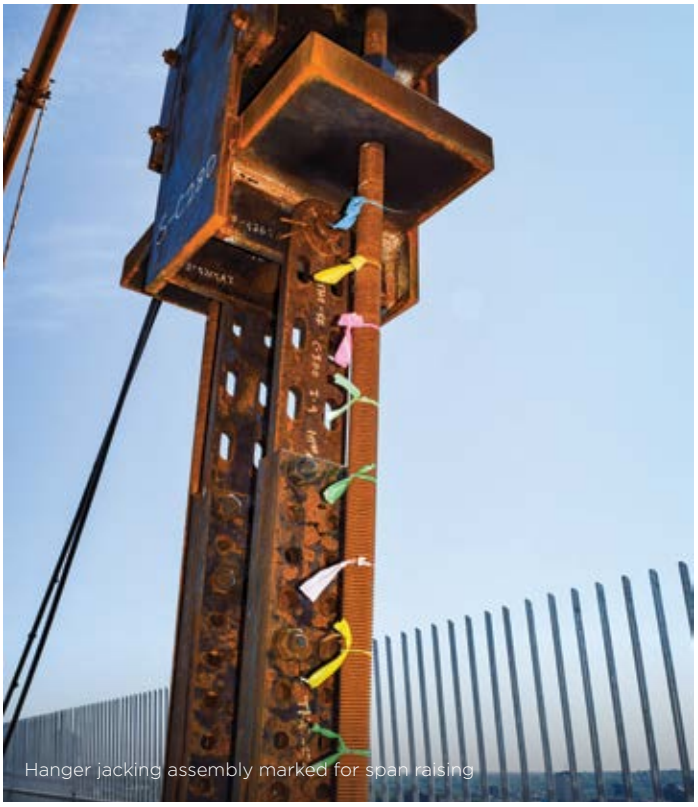

Existing 20 meter deck segment being lowered to barge


New 20 meter deck segment being lifted from barge


Adjusting loads in hangers with threaded rod jacking assembly

Cable crawler in place on main cable

Using extensometer to measure waisted rod elongation



Hanger jacking assembly marked for span raising

CABLE WORKS

During the construction, the loads in the hanger cables are significantly higher than the loads seen under normal conditions. To accommodate these loads, portions of the cable system are replaced throughout construction.

In each of the three suspended spans, two existing cable bands are removed and replaced with larger cast and machined cable bands. While these cable bands are replaced, the existing traction rods, which restrain the spans longitudinally, are also replaced. The existing cable bands are clamped to the main cable with six 41.3 millimeter diameter bolts, while the new cable bands use twenty-eight to forty-eight 31.8 millimeter diameter waisted rods. The additional clamping force between the new cable bands and the main cable is required to resist the longitudinal forces imparted by the new traction rods. Waisted rods in each new cable band are tensioned simultaneously with custom hydraulic bolt tensioners. Each rod is then measured with a custom extensometer to ensure the proper elongation and the proper load has been reached.

Other existing cable bands are able to remain in place, but still require additional clamping force to prevent slipping under the higher hanger loads during construction. In these locations the existing cable band bolts are replaced one at a time with waisted rods, which are tensioned with the hydraulic bolt tensioner and checked with the extensometer. The change in length of the existing cable band bolts is also measured to determine the original tension in the bolts. Based on these measurements, nearly 600 cable band bolts must be replaced with waisted rods. The cable bands are accessed from the two, 17-meter long cable crawlers with a self-contained winching system, which allows each crawler to move up and down the cable without the need for an external anchorage.

Following segment replacement, a threaded jacking assembly at each hanger is used to sequentially shorten each hanger and raise the bridge deck. This raising of the suspended spans provides an additional three meters of clearance to the water at the center of the Main Span, accommodating larger shipping vessels.

To provide this additional clearance, each hanger is jacked in increments of no more than 125 millimeters, for nearly 200 meters of total jacking. Leaning on lessons learned during the “Load Transfer” of the San Francisco-Oakland Bay Bridge Self-Anchored Suspension Span, the project team developed a simple color-coded system for implementing the required jacking sequence. This allows crews to quickly and efficiently perform the more than 1,500 individual jacking steps. Following span raising, each of the existing hangers are removed and replaced with a new hanger.

In addition to the Suspended Spans Deck Replacement contract, HHB awarded ABCC an optional bid item for the delivery of a complete main cable dehumidification system. In the years prior to design and contract tender, HHB had identified a cable dehumidification system as having potential significant value for the lifespan of the bridge. As part of the original contract tender, HHB requested pricing for an optional cable dehumidification system.

Cable dehumidification is a means of corrosion protection for both new and old suspension bridge cables, regardless of whether the cables are stranded or aerial spun. Corrosion protection is ensured by creating a sealed cable system into which dry air is forced until 40 percent or less relative humidity is achieved. The system then operates continuously for the lifetime of the bridge. On the Angus L. Macdonald Bridge, ABCC will seal and dehumidify all 958 meters of main cable, including back spans and both east and west cable anchorage chambers.

ABCC selected suppliers to assist in delivery of the system, including Munters Corporation, supplier of mechanical plant, and D.S. Brown, supplier of cable wrap. Thus far, ABCC has successfully worked with HHB and COWI to optimize the location of the dehumidification plant. Main cable wrapping, by means of the ABCC custom-designed cable access crawlers, will begin in winter 2016 and will be complete and operational by September 2017.

WORKING WITH STAKEHOLDERS

There are many stakeholders involved with this project from both land and sea. HHB's customer base, the traveling public, is the major stakeholder. Land-based stakeholders include nearby neighbors, Halifax Transit (public transportation operator), Emergency Health Services, Halifax Regional Police Department, Halifax Regional Fire Department, and the Canadian Department of National Defense (DND). On the water ABCC has interfaced with Halifax Port Authority (HPA), Atlantic Pilotage Authority, Halifax Transit, Canadian Coast Guard, DND, offshore energy projects, and local mariners. Because every stakeholder relies on the bridge in one way or another, coordinating work with them has been a very important component of the job.

The DND has a strong presence in the Halifax region. On the Halifax side of the bridge there is an Army base, on the Dartmouth shore there is a Naval repair facility, and most impacted by the project is the active naval base directly below and surrounding the Halifax Side Span. The DND was engaged prior to the onset of the project and coordination has been ongoing since construction began. Meetings are held to coordinate critical work that has the potential to impact either construction or base operations and plans were established to allow construction to continue with limited disruptions. The DND also has a concurrent construction project to install a new Jetty on the Halifax shore directly below and to the north of the bridge. Marine activities, specifically the positioning of barges to replace deck segments, were coordinated to mitigate delays and costs to either project.

The HPA operates the commercial dockyards, wharfs, and anchorages in the Halifax Harbour and schedules commercial vessel traffic under the bridge through a section known as "The Narrows". The water under the bridge is shallower than either the mouth of the harbor or the basin, limiting the navigation zone through which commercial vessels with high air drafts can safely pass. Vessel traffic during construction is controlled by HPA through their separate agreement with HHB.

The construction has also affected the traveling public, including cyclists and pedestrians, as the bridge is one of only two crossings of the harbor. The construction process required ABCC to remove both the sidewalk and bikeway on the bridge, the only ones to span the harbor, prior to replacing deck segments to reduce weight on the bridge. During this period, HHB runs an around the clock free shuttle bus service to transport pedestrians and cyclists from one side of the harbor to the other. The new sidewalk and bikeway is scheduled to open at the end of December 2016.

SAFETY

Safety is always the number one priority on any American Bridge project, and the Angus L. Macdonald Bridge is no exception. The philosophy of "See Something, Say Something" (see AB Connections Issue #1003) has helped to focus the local safety culture on correcting unsafe behaviors before they become an incident. Reporting of unsafe conditions and unsafe acts has been key in reducing the possibility of job-related injuries. Safety observations as required by the Site Health & Safety Program have been conducted by management, field specialists, site supervisors and the safety department throughout the project construction.

Fall protection requirements have been a main focus to ensuring worker safety. With the combination of safety, engineering, and participation from the field, numerous steps have been taken to provide safe access to work areas. Training on fall protection equipment including the use of rescue devices and the establishing of best practices for fall protection has been another key focus area.

ABCC has been working with the Nova Scotia Occupational Health and Safety (NS OHS) Provincial Regulator in establishing an open-door policy.

Photo credit: Dale Wilson Photography

The Regulator has been on the project site on different occasions to familiarize themselves with the construction activities and to view the best practices and safety procedures ABCC is following. There have been several site visits and no health and safety compliance issues on the project.

The team at the Angus L. Macdonald Bridge pride themselves on the implementation of safety on this project. Assistant Project Manager Adam Reeve's field engineer team, along with input from the Site Superintendent Robert Fitz, and American Bridge's engineering staff in California, work diligently to ensure that sound engineering practices are followed allowing the highest level of safety. Daily safety huddles, weekly tool box meetings, and the review of job hazard analysis have also contributed to improving communications between all parties. On-going in-house training on hydraulics, jacking systems, and safety practices have increased the level of expertise and confidence within the workforce.

Now that the installation of new deck segments will be directly over public facilities, ABCC has developed programs and procedures to help protect the public. A Dropped Object Prevention Program has been implemented that incorporates the use of high alert awareness, tool tethers, self-closing bolt bags, and daily site-observations. The development of these programs is informed by numerous other American Bridge experiences working over live traffic and occupied buildings (Tagus River Bridge, Lions Gate Bridge, Severn Crossing, Queensferry Crossing, Tappan Zee Bridge) and ensures the safety of the public, the workforce, and other active assets that may be below ABCC's worksite.

With the top equipment, training, and implementation of best practices and engineering procedures, the team at the Angus L. Macdonald Bridge project will continue to reduce risk, lower incident rates, and work to ensure the safety of everyone, including the public.

As the deck replacement portion of this project comes to an end in December 2016, the cable dehumidification will be ongoing for the next year. All work will wrap up in September 2017, marking the close of yet another unique project. As a feat that has only been done once prior, it is no surprise that American Bridge has been at the forefront both times, living up to expectations.

BORN A BUILDER

President and CEO Michael Flowers is retiring after a career of engineering, constructing, and leading

Great leaders are rarely flashy. They don't seek the spotlight, or feign modesty. They are leaders because they have built relationships based on mutual respect, honesty, and unquestionable integrity. He would never be comfortable shouldering the title of a great leader, but anyone who has met Michael Flowers will undoubtedly tell you he is. After over 40 years in the construction industry, the majority of them with American Bridge, Mike is retiring as President and CEO of the company.

Mike's start at American Bridge was almost by chance. While sitting in the career office of West Virginia University, waiting for an interview with another company, Mike struck up a conversation with someone sitting next to him. As fate would have it, he was a representative from US Steel, parent company of American Bridge at the time. They got to talking about Mike's interest in civil engineering, and the New River Gorge Bridge (AB order # K-5867-81) that was under construction just down the road from Mike's summer job. It wasn't long after that day that Mike received an invitation to interview with American Bridge, the company he would eventually lead.

The funny thing is, if Mike's original plans for a career panned out, he'd be working on some out-of-this-world projects—literally. "I was really a child of the space program," explains Mike. "I remember when they made an announcement that Sputnik was launched by the Russians, and I had no idea what Sputnik was, or a satellite, or anything else. I had to go home and have my parents try to explain what it was."

This fascination led to Mike enrolling in the Aerospace Engineering program at West Virginia University. The prospects were fantastic: the space program was booming, and the concept of supersonic transports was at its peak. Two years into college however, NASA cratered, and the possibility of finding a job was as distant as the outer reaches of the Milky Way. Mike took one class in mechanical engineering and hated it. He ended up in civil, and spent summers surveying along US-19, which led up to the New River Gorge jobsite. "I used to drive down in the evening and look at what AB was doing erecting the bridge," recalls Mike. After graduation, Mike was cooling his heels in the University's placement office when he struck up that fateful conversation with the gentleman from US Steel. He attributes his start with American

Bridge to New River Gorge and being in the right place at the right time.

Mike makes no bones about the fact that he is, and always will be, a field guy. "Frankly, I'm a builder. That's what I enjoy doing. Everything that epitomizes American Bridge's culture are the things that I enjoy: coming up with new ways of doing things, being innovative, daring to do things differently, and doing things well as a result." It was quite late in his career that he was sent out on his favorite project, the San Francisco-Oakland Bay Self-Anchored Suspension Span (SAS). It was a perfect fit: a unique, highly-challenging job, and a Project Director determined to build it. "Getting to do it late in my career, one-of-a-kind bridge, working with a lot of unbelievably talented young people—it was an incredible thrill and a lot of fun to go to work every day. I'd do it again in a heartbeat," he says with a wide smile.

It wasn't always the case that engineers were placed onsite at American Bridge jobs. When Mike started in January 1975, there was a wall between the engineering and construction departments. It was extraordinarily difficult to move between the two. It took more than six years for Mike to penetrate the construction side. Now, he notes, the connection is seamless. "Our folks would be at the computers doing calculations, developing means and methods, and the engineering that supported it. And when the engineering was done, they put their coveralls on and went out and helped build it." Mike always maintained the direct relationship between in-house engineering and construction, a key aspect of the American Bridge way. Through his leadership and mentoring, countless engineers have adopted this outlook on projects—something quite unique to American Bridge.

Mike's resume includes a number of never before seen projects, including the Lions Gate Bridge Rehabilitation in Vancouver, British Columbia. American Bridge was awarded a contract to replace the entire suspended spans of the 2,778-foot bridge. Mike calls it the most difficult job of his career. "It was just a myriad of tough challenges. Maintaining traffic on the bridge, changing out the segments overnight. The means and methods were really all our responsibility." There was even a scheme to replace the segments without ever closing the bridge—an idea that Mike and the team fought with the engineer over. In the end, circumstances didn't allow them to move forward with what he admits was a "crazy" scheme, but he never gave up on pushing the perception of possible.

That push for innovation followed Mike throughout his career, and was a key characteristic of his leadership. He'd consider any idea, no matter how impossible it seemed, if there was a chance it could do the job better, faster, and safer. "Sometimes it's hard not to say, 'that's the craziest idea I've ever heard' but you have to be open-minded," says Mike. "I remember when Tommy Melvin, Lanny Frisco, and Kwadwo Osei-Akoto and I were getting ready to do the Triborough Bridge job, which was changing out the existing bridge deck a lane at a time, and there were eight different lanes. Conventionally, you'd put a small crane in a lane and you would open it up and work sequentially.

"It was an incredible thrill and a lot of fun to go to work every day. I'd do it again in a heartbeat."

> **Everything that epitomizes American Bridge's culture are the things that I enjoy: coming up with new ways of doing things, being innovative, daring to do things differently, and doing things well as a result.**

Tommy Melvin finally said 'why don't we put an overhead crane on the existing stiffening truss on the bridge?' Tommy would give you ten ideas, nine of them were probably harebrained, but one would be a real gem." By the time Mike and Lanny got back to Pittsburgh from New York City, they had started to buy into the idea, and eventually embraced it. "We developed the concept and now everybody does it," recalls Mike. The culture of innovation, perpetuated by leaders like Mike, allowed for a seemingly crazy idea to become an industry standard.

Besides relentless improvement, another hallmark of Mike's career has been his reputation as a tireless worker. He attributes much of that to his father, a man with a military background who worked hard every day. "I grew up in a very simple home. My dad was never too proud to do anything to try and support the family. He brought that out in me to the best of his ability, through good times and hard times. He gave me a lot of morals—honesty, that your word is your bond, strength of character, and to treat people fairly."

As a young engineer, Mike worked for Bill Gibson, who he still considers a mentor. Other influential people in Mike's life include Dave Rees, who was instrumental in getting American Bridge back into the suspension bridge business with the Tagus River Bridge, and Bob Luffy, who was CEO before Mike. "I have great admiration for the vision that Bob had and what he was able to do. He didn't do it alone, but he had the vision to bring the company back into what it is today," he notes. Vern Decker is another name Mike brings up. Despite Vern's notorious tendencies, they got along well. It's clearly a struggle to single out so few names when looking back over a 40 year career. Now among a group that includes his role models, Mike thinks back over what he's said about previous retirees. "We've got an unbelievable legacy and frankly, I look upon it as a real burden for people to uphold. I feel really good about the young people that have come into the company and the capabilities that exist. We have to be vigilant and be aware of the challenges and risks, but it's a dramatically different company than it was 20 years ago."

Mike's term as CEO began in January of 2011, marking a major shift in responsibilities—and offices. He admits it was hard to transition out of the field, and there was no roadmap to success as the head of the company. He has a fleeting regret that perhaps an MBA would have been more beneficial to a CEO than his masters in engineering. But no—an MBA would not have helped to shape him into the engineer he became. "Understanding that American Bridge has an incredible culture of complex engineering, I think it was important to me at the point in time I was CEO that I was

"Mike is a person who could give you either a soft pat on the back or a hard kick in the butt, all during which you never lost sight of the great man he was and someone you will always be proud to call a mentor and more importantly a friend."

—Brian Petersen,
Vice President

"I've had the privilege of working for Mike for the last 9+ years. Mike led by example. He worked as hard as anyone and always made his people —the AB Family—a top priority. I'll always be thankful for what I've learned from him."

—Robert Landers,
Risk Manager

"I can't tell you how much I have learned from Mike in the short time I have spent with him since my arrival at AB. I will miss his calm demeanor and expert knowledge in all kinds of subject matter, as Mike just had a way of getting a point across that could break down even the most complicated matters into a practical, workable solution. All the best in your new phase of life Mike. FISH ON!"

—Terry Poole,
Chief Operating Officer

"My career started when Mike interviewed me 21 years ago. Not a bad starting point. When I first heard of Mike's impending retirement it was hard to imagine AB without him. But then I looked back over the last 21 years and thought of all the things Mike has done for me, AB, and the industry in general and realized that it's not about the fact that he is leaving. It's about what he is leaving behind. A legacy of how to succeed in this industry, or any for that matter. Work hard. Work smart. Act with integrity. Be a mentor. And above all lead by example. Mike built a solid foundation for the future. Thanks to him we are prepared to lead AB into the future."

—Bob Kick, Construction Manager,
Tappan Zee Hudson River Crossing

"We've been very fortunate to have the enlightened leadership of such an eminent engineer and operator as Mike Flowers, and we look forward to his continued guidance and wisdom in a new role."

—Mike Cegelis,
Senior Vice President

"Mike embodied the core of American Bridge; he was an engineer, manager, and leader second to none in each aspect. There was always an aura of confidence with Mike steering the ship. It was an honor to work for one our industry's giants."

—Nick Greco,
Chief Engineer – East

an engineer," he confirms. When asked if he may pop up on a job site from time to time, Mike just smiles, and one gets the feeling that he likely won't be a stranger.

It's clear that retirement is bittersweet for a man that has spent most of his life constantly moving, engineering, and leading. On one hand, the prospect of slowing down a little is appealing. On the other, the idea is dissatisfying. Mike likens it to when a football player, worn from years on the field, is asked what he'll miss most when he retires. It's never the game, though that's surely part of it. It's the people. "I look around at a lot of the folks I've hired and gotten to know so well, I'll really miss them," says Mike. He is most proud of simply playing a role in transforming American Bridge into what it is today—not leading it, just playing a role. "There's no doubt in my mind that some of these young folks are going to continue to grow into positions of authority. That's really where the future of the company is brightest. We have to maintain the culture of American Bridge so that these people are happy—damned happy—to be coming to work here every day. If we lose that, we'll lose everything in my mind."

The culture that Mike so strongly embodies is the reason American Bridge has sustained for 116 years. Mike chuckles when he recalls that when American Bridge was awarded the Las Vegas High Roller, the world's tallest observation wheel, there were rumblings across the industry. No way can they build that thing. But build it we did. Challenges, to people like Mike, are not impossibilities—they are simply something to set your sights on, and conquer.

In the near future, Mike plans on permanently moving to his house in West Virginia. He'll spend more time with his wife, and watch his grandchildren's sporting events and recitals. He plans on traveling for pleasure, not for a job, and taking his wife, Debrah, to Europe and Asia. And plenty of trips to California when cold weather hits the east coast—there's better wine there, after all. But it's easy to see that a part of him will stay with American Bridge, as it does for every great in the company's legendary history. Mike stands out not because he speaks louder, or demands to, but because he has earned the respect of an entire industry through hard work and integrity.

It's perhaps fitting that his parting words are those of progress. "Don't be afraid to try new things and be innovative. It's a great place to work. It's been a heck of a ride for the 30-something years I spent here. Have a lot of pride and continue to do what we've always done."

Mike, thank you for your service, your leadership, and your countless contributions. The entire American Bridge family wishes you the absolute best. Cheers.

IN THE NEXT AB CONNECTIONS...

As Mike Flowers steps down, Paul Boechler has stepped in as American Bridge's new President and CEO. In the next issue of AB Connections, we'll get to know Paul, get his thoughts on his first six months on the job, and his outlook for 2017.

Paul has large shoes to fill, but there is no doubt that he will rise to the occasion. With his experience, Paul has big plans for American Bridge, and he is someone who is well-suited to take on the challenges that lie ahead. Stay tuned for our Winter 2016 issue of AB Connections where you'll learn more about Paul and his passion for driving American Bridge down a path of continued excellence.

KEVIN SMITH

CHIEF ENGINEER - WEST

What brought you to American Bridge?

I was hired by American Bridge as a field engineer for the construction of the Walt Disney Concert Hall in Los Angeles, preparing connection designs for the fabricated steel structure, reviewing shop drawings, and developing erection procedures. One of the most intriguing elements of the project were the curved and inclined walls of the structure, which I developed detailed erection procedures for, but unfortunately, the project was stalled due to lack of funding and eventually built by another contractor.

You started at AB as a Field Engineer in 1994, and have worked your way up since then. How have all of your past experiences helped you achieve such success in the industry?

I have been fortunate to be a part of some very complex projects that required innovative construction methods. American Bridge has a long history of constructing these types of projects and recent AB retirees, Ron Crockett and Ugo del Costello shared their knowledge with me, as I am doing now with AB's younger engineers.

What is the most challenging project you have worked on thus far? Your favorite?

While the challenges of the Walt Disney Concert Hall were new to me, it quickly became clear that complex construction is not new to American Bridge, which actively pursues these types of projects. Each project that I have worked on has been unique and challenging in its own way. On the Tagus River Bridge, the first time a second main cable was installed on a suspension bridge while keeping it open for public use. The reconstruction of the Lions Gate and Angus L. Macdonald bridges were the first and second times where aging suspension bridge stiffening trusses were replaced with new orthotropic bridge decks in short duration closures. The beautiful San Francisco-Oakland Bay

Bridge, which I also worked on, is the largest self-anchored suspension bridge in the world.

You've worked on projects in the states and internationally for AB. What were the biggest differences and similarities you noticed?

On large structures like these, whether domestic or international, the bridges are more than just a means of getting from one place to another. These iconic structures are part of the fabric of the city, and the communities take enormous pride in their bridges and have great interest in the progress of these projects.

Working in Portugal on the Tagus River Bridge was obviously the most different of the locations that I have worked. The language differences, training of craft labor, and mass holidays in August were some of the cultural challenges that were overcome.

How did your previous experiences prepare you for your role as Technical Director on the San Francisco-Oakland Bay Bridge Self-Anchored Suspension Superstructure?

Many of the projects that I have worked on have been suspension bridges that required innovative construction methods and coordination with the designer and engineering consultants. The San Francisco-Oakland Bay Bridge Self-Anchored Suspension Superstructure required implementation of traditional suspension bridge construction methods as well as extensive engineering and modeling to address the unique aspects of the project. These included the temporary support of the box girders, three-dimensional main cable, load transfer into the inclined suspenders and analysis of the resulting main cable rotation.

What is a typical day like for you?

My days are typically filled with means and methods engineering in one form or another. This can include structure modeling and analysis, design of temporary works equipment, preparation and checking of erection procedures, writing RFIs, coordinating with the site superintendent and project engineer, or meeting with the owner and their subconsultants to find solutions to construction issues.

"I have been fortunate to be a part of some very complex projects that required innovative construction methods. American Bridge has a long history of constructing these types of projects and recent AB retirees, Ron Crockett and Ugo del Costello shared their knowledge with me, as I am doing now with AB's younger engineers."

What is the best part about working for AB?

American Bridge builds "once in a lifetime" projects all the time; I have been on five. To construct these complex, one-of-a-kind, never-been-done-before structures all over the world, American Bridge relies upon its strong in-house engineering services. Every day I work alongside some of the best engineers, project managers, and superintendents in the industry.

Working for AB is particularly rewarding when erection procedures or temporary equipment designs that I have contributed to are executed on site, and the benefits of all that hard work is realized in the success of the project.

What do you do in your free time? Do you have any hobbies or interests?

I enjoy hiking, fishing and camping with my wife Ellen, son Jacob, daughter Jessica, and two dogs.

Remembering
FRANK MYDLINSKI

Dedicated is a word used often to describe Frank Mydlinski. Dedicated employee. Dedicated family man. When American Bridge learned of the passing of Frank on June 19th, the news hit hard.

Frank had 36 years of experience in the construction industry, working throughout the country in various positions. After graduating from Clarkson College of Technology, he entered the construction industry and quickly gained multiple certifications and licenses in the Quality Control/Quality Assurance field. Most of his career was spent with other heavy/civil construction companies. However, American Bridge lucked out in 2014 when Frank was named Quality Manager at the Tappan Zee Hudson River Crossing project. He joined American Bridge as a seasoned and experienced QA/QC Manager and had already successfully managed many large design-build projects across North America.

Frank was especially talented in his field. He possessed skilled dialogue and in-depth expertise, earning a mutual respect with coworkers, partners, and owners. His ability to foster a trusted relationship with the client on the Tappan Zee Hudson River Crossing project cannot be understated. His contributions made us all proud to call him a part of the American Bridge family.

Although Frank was only with us for just under two years, that does not limit the many great things he did while with the company. He showed dedication to his work right up until his very last days. His wife, Carol, said he loved to talk shop. Frank was even lining up a visit to the Tappan Zee Bridge just a week before his passing—and that was just the kind of employee Frank was. His devotion to the Company was admirable and the commitment he had to his job was truly one of a kind. He stayed devoted to the job even in his illness, and insisted on working until he absolutely couldn't partake in any field work. Many of his emails during this time ended with the phrase "Later, have a bridge to build..." exemplifying his passion for what he did.

While Frank was extremely dedicated to his profession, nothing came before his family. But he even wove his family time in with his coworkers. He was known for hosting various picnics and banquets, and was even notorious for his Fourth of July fireworks display. The image of his fellow colleagues' children running around with sparklers is something that won't soon be forgotten by those who were lucky to be there.

Frank also had other passions. As an avid outdoorsman, his coworkers always knew that Frank would be taking his time off in November so that he could get his bow out and sit in a tree stand, no matter where in the country he was at the time.

He was dedicated to his family, his hobbies, and his profession—and American Bridge was lucky to be on Frank's list of high ranking priorities. We will forever be thankful for his contributions.

“I only had the opportunity to work with Frank for 18 months, not much less than his time with American Bridge. Frank was the perfect example of not being able to judge a book by its cover. You could never be sure what was going to come out of his mouth, but inside that rugged exterior was a guy that was able to build a positive relationship with the Owner and instill a sense of confidence that we were delivering a high quality bridge. Despite a short tenure with American Bridge, Frank was deeply dedicated to the company and his impact, influence, and integrity will be sorely missed.”

–Bob Kick
Construction Manager,
Tappan Zee Hudson River Crossing

“I had the pleasure of working with Frank for over 20 years. He was the salt-of-the-earth and really exemplified the work that we do with his devotion, expertise, and professionalism. Rest in peace Bowhunter.”

–Terry Poole
Chief Operating Officer

“Don was well-liked and respected by everyone on the project and was always willing to help out where needed. He was very enthusiastic about working for AB and had looked forward to future projects. For those of us who worked with Don, he will be missed.”

–Wes Grandmont
Operations Manager

Remembering
DON ULEMEK

Don Ulemek was a seasoned safety professional who was well-liked by everyone who knew him. When he passed away on August 16th, AB lost a friend and a wealth of knowledge.

Don joined AB in March 2015 bringing over 20 years of safety experience to the Explosives Handling Wharf #2 project in Silverdale, Washington. As the Alternate Site Safety and Health Advisor, he performed new hire orientation, oversaw crane operation during steel erection of the wharf cover, and trained employees in fall protection. He also held full SSHO duties on the night shift of this job.

The unwavering dedication Don had to safety was very evident. As a Certified Safety Manager within the World Safety Organization, he built a career around successfully reducing work-related injuries and illnesses, mitigating occupational hazards, and improving regulatory compliance within a diversity of business sectors. And although he was only with AB for under two years, his background and the countless years he spent in the safety industry is proof that he was 100 percent dedicated to his craft. To aid in Don’s successes, he held a Bachelor of Science in Occupational Safety and Health from Fresno State University and also served in the U.S. Navy as a Medical Field Service Technician.

The loss of an AB employee is always a great impact to the Company and Don is no exception. He will be greatly missed.

NEW EMPLOYEES

Kevin Anderson Senior Estimator, Detroit, MI

Joseph Bennett Facilities Manager

Adam Celmo Senior Field Engineer, St. Thomas, US Virgin Islands

Christopher Filek Field Specialist, Ft. Erie, Ontario

Jacqueline Gerlach Health and Safety Advisor, Edmonton, Alberta

Ali Hosseini Project Engineer, Edmonton, Alberta

Brian Jouflas Field Engineer, Tappan Zee

Michael Kroner ECM Manager

Steven Levesque Superintendent, Ft. Erie, Ontario

Barrett Luciak Field Specialist, Edmonton, Alberta

Dominick Mattucci Network Administrator

Tadas Mazeika Superintendent, Delaware

Padraig McGinn Project Manager, Edmonton, Alberta

Xiaoxi Song Estimator

Jeffrey Stauber Document Imaging Specialist

Cory Sutherland Field Specialist, Ft. Erie, Ontario

EVENTS + NEWS

- Carson Carney, Senior Project Manager, presented a paper at the 33rd annual International Bridge Conference (IBC) in June. The presentation was titled “Design and Construction of the Queensferry Crossing”.

- Kevin Smith, Chief Engineer – West, and Carson Carney, Senior Project Manager, presented papers at the International Cable Supported Bridge Operators’ Conference (ICSBOC) in June in Halifax, Nova Scotia. Carson’s paper was titled “Structural Health Monitoring System installation and use on the Queensferry Crossing” and Kevin’s was called “Macdonald Bridge Suspended Spans Deck Replacement: Engineering Challenges and Solutions”.

- American Bridge held its annual company meeting from September 30th to October 1st at the Nemacolin Woodlands Resort in Farmington, Pennsylvania. Employees from all over the world gathered at the resort not only to hear updates on the company’s past year, as well as the year ahead, but for some fun and relaxation too!

CURRENT CONTRACTS

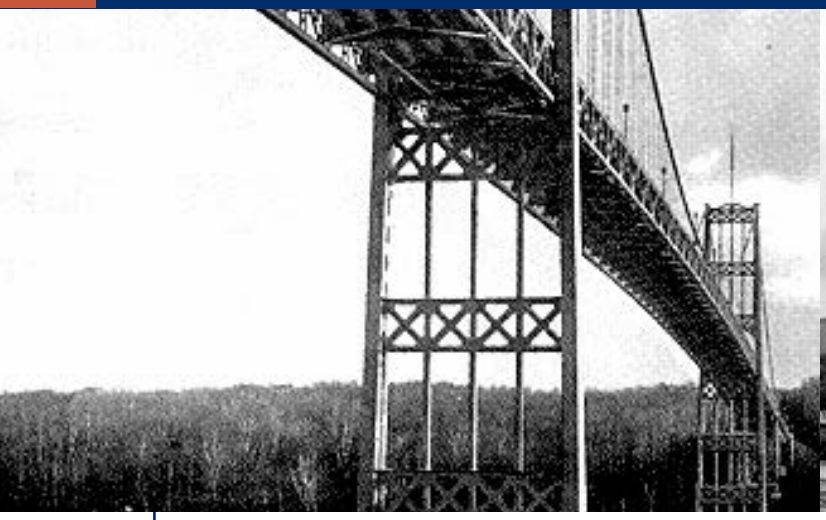
- **Explosives Handling Wharf #2** Silverdale, Washington
- **Horseshoe Arch Pedestrian Bridges** Dallas, Texas
- **U.S. 69 Missouri River Bridge** Riverside, Missouri
- **Blount Island Marine Terminal Wharf Reconstruction** Jacksonville, Florida
- **Friendship Trail Demolition** Tampa, Florida
- **Portageville Bridge Replacement** Portageville, New York
- **Queensferry Crossing** Edinburgh, Scotland
- **Angus L. Macdonald Bridge Suspended Spans Deck Replacement** Halifax, Nova Scotia
- **M48 Severn Bridge Main Cable Inspection** United Kingdom
- **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, US Virgin Islands
- **BNSF RR Truss Bridge Over I-235** Oklahoma City, Oklahoma
- **WV Corridor H – Kerens to U.S. 219** Tucker/Randolph Counties, West Virginia
- **Peace Bridge Rehabilitation** Buffalo, New York
- **Edmonton Valley Light Rail Tawatina Bridge** Edmonton, Alberta

PROJECT WINS

TACONY-PALMYRA BRIDGE BASCULE SPAN MECHANICAL SYSTEMS REHABILITATION

Philadelphia, Pennsylvania and
Palmyra, New Jersey

FLASHBACKS



WALDO-HANCOCK BRIDGE

Location: Verona, Maine
Completion Date: 7/1/1931
AB Order #: G-3691-8

85 years ago, American Bridge fabricated and erected all superstructure and approaches, including towers, cables, and roadway decks for the Waldo-Hancock Bridge. The name of the bridge is derived from the two counties in Maine that it connects. This 2,040 foot bridge had an 800 foot long mainspan and was a gravity anchored, deck truss suspension bridge that crossed the Penobscot River in Verona, Maine. It was demolished in 2013.

DUARTE BRIDGE

Location: Santo Domingo, Dominican Republic
Completion Date: 7/1/1955
AB Order #: A-18

American Bridge was the general contractor for the Duarte Bridge completed 61 years ago in 1955. The Duarte Bridge, also known as the Rhadames Bridge, is a highway suspension bridge with helical structural wire strand main cables. It crosses the Ozama River in the capital city of the Dominican Republic, Santo Domingo.

BNSF – GALVESTON CAUSEWAY BRIDGE

Location: Galveston Bay, Texas
Completion Date: 3/17/1989
AB Order #: C604NB

27 years ago, American Bridge self-performed all design and engineering, structural steel work, and machinery installation for the replacement of the double track, single-leaf rolling bascule with a new track. To accommodate rail traffic, phased construction was utilized. One track of the existing bridge remained in place while the new 110 foot long, 15 foot wide bascule was constructed on the opposite pier. Rail traffic continued with minimal interruption throughout the construction. Once the new bridge was completed, traffic was restored to the first track and the old bridge was demolished.

E.E. WILLIAMSON ROAD PEDESTRIAN BRIDGE

Location: Sanford, Florida
Completion Date: 7/29/2005
AB Order #: 455110

11 years ago in 2005, American Bridge constructed a new pedestrian bridge north of Orlando, Florida for Seminole County. The E.E. Williamson Road Pedestrian Bridge is a four-span, 285 foot by 9 foot bridge that crosses Interstate 4. American Bridge was responsible for constructing two concrete piers and two abutments, erecting eight steel girders, placing and finishing the concrete deck, and installing a new railing. During construction, American Bridge also provided maintenance of traffic and demolished the barriers and sidewalks on the existing bridge.

THREE SISTERS STAND OUT IN THE CITY OF BRIDGES

Pittsburgh—the City of Bridges and home to American Bridge Company. Coincidence or not, it seems as though American Bridge found an appropriate place to call home over 116 years ago. Since then, AB has had a hand in building many of the bridges in Pittsburgh and the surrounding areas. But in downtown Pittsburgh, there are a few iconic ones—bridges that are a prevalent part of the city's famous skyline.

Painted the symbolic yellow-gold that is indicative of Pittsburgh and a dominant color for all Pittsburgh major league sports teams, the Three Sister Bridges are important thruways across the Allegheny River since the 1920's. Because the city is surrounded by three rivers, bridges are a very necessary part of the city's architecture.

These three bridges are collectively called the Three Sister Bridges because of their almost identical nature and because they sit directly next to each other, mirroring one another, with less than half a mile between the three. However, each has its own identity and are also known as the 6th, 7th, and 9th Street Bridges. Many years after construction, the bridges were renamed to honor famous Pittsburghers: an artist, Andy Warhol; an athlete, Roberto Clemente; and an environmentalist, Rachel Carson.

Roberto Clemente was an exceptional player for the Pittsburgh Pirates Baseball team in the 1950's, 60's, and 70's. Fittingly, the Roberto Clemente Bridge sits directly next to PNC Park, the major league baseball stadium home to the Pirates. On the same note, directly on the North Side of the Andy Warhol Bridge is where the Andy Warhol

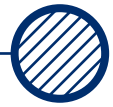
Museum calls home. The only bridge of the three that does not have a direct connection in the immediate area is the Rachel Carson Bridge. However, the Rachel Carson Homestead, now a National Register of Historic Places, is just up the Allegheny River in Springdale, Pennsylvania.

During a time of great economic growth in America, also known as the "Roaring Twenties", AB fabricated and erected these famous bridges during a four year period from 1924 to 1928. The Andy Warhol Bridge was first to be built. It was completed in 1926 and later in the same year, the Rachel Carson was completed. Two years later, in 1928, the third and final "sister", the Roberto Clemente, was completed.

These bridges are one—or three—of a kind. As the only trio of almost identical side-by-side bridges in the world, and the first self-anchored suspension spans built in the U.S., their uniqueness is unrivaled. These bridges are identified as self-anchored, eye-bar suspension type bridges because the horizontal pull of the top chords is resisted by the steel girders along each side of the roadway. The suspension system on each bridge consists of 14 inch eye-bars extending from end to end with two pins on the top of each tower. The roadway is carried by four inch eye-bar suspenders at the panel points. The stiffening system consists of triple web plate girders placed parallel to the road grade. The girders are thus subjected to stresses due to bending combined with direct compression. In an innovative approach, AB temporarily turned the eye-bar catenary/deck girder system into a truss by adding a diagonal to enable erection by balance cantilever—avoiding falsework in the river. Each bridge has a mainspan length of 442 feet, an overall length of 995 feet, and a width of 66 feet.

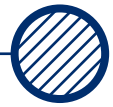
These unique bridges have received many awards throughout the years that prove just how iconic they are. In 1929 the Roberto Clemente won the American Institute of Steel Construction (AISC) Beautiful Bridge award and in 2001 the Rachel Carson Bridge won the 2001 AISC Prize Bridge. In 1988, the three bridges were collectively named a Pittsburgh Historical Landmark.

The placement of the three bridges puts them at the very center of activity in downtown Pittsburgh. It has been 92 years since construction began on these important connectors, but they are still standing and in use by vehicles and pedestrians today, helping the Pittsburgh community move throughout the thriving city.



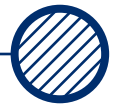
ROBERTO CLEMENTE (SIXTH STREET BRIDGE)

Location: Pittsburgh, Pennsylvania
Completion Date: 9/29/1928
AB Order #: E-6214-20



ANDY WARHOL (SEVENTH STREET BRIDGE)

Location: Pittsburgh, Pennsylvania
Completion Date: 5/29/1926
AB Order #: E-6200-6



RACHEL CARSON (NINTH STREET BRIDGE)

Location: Pittsburgh, Pennsylvania
Completion Date: 10/26/1926
AB Order #: E-6207-13

Mid Hudson Bridge - Poughkeepsie, New York

HISTORY OF THE **HARD HAT**

One of the most distinctive pieces of personal protective equipment (PPE) and symbolic of construction is the hard hat. While the hard hat is representative of an entire industry, its use does not date back as far as one may think. Many years ago, people worked on construction projects with no head protection at all. So when and how did it become arguably the most important thing a construction worker wears? Read on as we delve into the history of the iconic hard hat.

The evolution of the hard hat began with miners around the turn of the 20th century. The mining industry was faced with numerous fatalities as a result of falling objects, creating a major concern. Therefore hats were developed to protect the heads of the workers. At the time, only two companies made hard hats, MSA (Mine Safety Appliances) and Bullard, both of which are still in the business today. The Bullard hard hat was initially made of layers of steamed canvas and glue. The hats served their purpose of protection at the time—they were sturdy, lightweight, and non-conducting—but the hard hat was refined over the following years as better materials and better technologies became available.

Years later, it became apparent that hard hats could be used as a protective measure in other industries. The mining hats were then transformed into an industrial hard hat, with the Hoover Dam project in the early 1930s becoming the first in the United States to require its use. In 1933, when construction started at the Golden Gate Bridge, they followed suit. Although neither of these were American Bridge projects, the trend began to catch on with others, and hard hats started to become much more common at our jobs sites.

When American Bridge was founded, hard hats hadn't even been created. Much has changed since 1900, including the use of PPE. During the construction of the Mid Hudson Bridge in Poughkeepsie, New York, built by American Bridge from 1929-1930, there is record of workers not using any sort of head protection on site. But just a few years later when the San Francisco Oakland Bay Bridge East and West spans were being built by AB, hard hats seem quite prevalent.

Throughout the years, the hard hats have evolved to make them more durable and dependable. They started as aluminum, then Bakelite in the 1940s. In the 1950s, they were made from fiberglass and polyethylene plastic in the 1960s.

San Francisco Oakland Bay Bridge
East and West - San Francisco, California

San Francisco Oakland Bay Bridge
East and West - San Francisco, California

Today, the majority of hard hats are made from polyethylene plastic, but the traditional bridgeman's hat is made from resin. American Bridge has used the MSA hard hat for decades. The formal name for this hat is the Skull Guard, but it is more commonly known as the "bridge hat". Call any reputable safety supply store and ask for an MSA bridge hat, and they'll know exactly what you're talking about. The bridge hats with a painted AB logo on them have become a collector's item among ironworkers. They can change hands for hundreds of dollars—much more than a brand new hat would cost. The connection to AB, the nostalgia these hats represent, and the symbolism of American Bridge's legacy, is what makes these hats so coveted in the industry.

Early on, AB made their hats even more significant with the distinctive "AB" painted on the front in plain letters. These letters appeared to be nothing more than an intent to identify workers as AB employees. But these plain letters did have significance to their owners—they were a symbol to the ironworkers that they worked for the leading bridge builder of the time. Ironworkers take particular pride in their hard hats, covering them in stickers that tell a story of where they've been and what they've built. "It seems silly to a lot of people but it is very difficult for most ironworkers to wear a 'company' hard hat. It's like giving up a piece of yourself. The AB bridge hat is the exception to that rule," said Robbie Fitz, a veteran American Bridge Superintendent.

Throughout the industry, different colored hats have signified different things. During the 1960s and the 1970s, from San Diego to the Bay Area in California, the color of the Bullard hard hat you wore represented the company you worked for. These days, it is common for the color of a person's hat to indicate a job title—white, brown, green, yellow, blue, grey—each one can signify a ranking, or even industry. However, the traditional MSA bridge hat, which is made of resin, is always brown. The hue of the brown is what differs. When new, the MSA bridge hats come out of the box a light shade of brown. Years of exposure to the sun causes the fiber-reinforced resin to darken. The older the hat, the darker the color, a signifier of years of proud work in the industry. Some of the extremely old hats with the hand-painted AB logo are nearly black from years of service.

When the Occupational Safety and Health Act of 1970 was signed, the Occupational Safety and Health Administration (OSHA) was established. OSHA continues to drive advancements in working conditions and jobsite safety, including the use of hard hats. But to many, these symbolic hats are much more than a safety measure. They are a coveted piece of history, and those who work for AB are proud to practice safety—with hard hats on, of course.

AB CONNECTIONS
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CONNECTIONS

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Fall 2016 – Issue #1005

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