



Historic Bridge Bulletin

Volume 8, Number 1
May 2021

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The Duncan Bridge carries Curry Highway (CR-41) Over Lewis Smith Lake (Sipsey Fork Black Warrior River) in Winston County, Alabama. With a 1967 construction date, this bridge was likely among the last truss bridges to be built in the state using all-riveted construction. *Photo by Nathan Holth.*

A Word About Bridgehunter.com

The bridge world is saddened by the sudden death of our friend, James Baughn. People across the country who are interested in historic bridges are aware of his valuable and extensive website called Bridgehunter.com. The amount of information found in the website is beyond compare and, as James's legacy, something that everyone believes should continue.

The Historic Bridge Foundation is privileged to be the new administrator of Bridgehunter.com, at the request of James's parents, Stan and Debra Baughn. We will do our best to honor James by keeping the site (as well as LandmarkHunter.com) running smoothly and up to date. We hope to make as few as possible changes to the site. However, there are a few changes we have made that are worth noting:

1. The "About" page of the website has been expanded to include some legal policies we chose to add to ensure the Foundation is protected from any liability.
2. We have retired James's webmaster email and encourage visitors to use the forum to ask any bridge-related questions, while anyone with technical problems about the website itself can email info@historicbridgefoundation.com
3. For new users signing up for an account, we now require them to introduce themselves to the community via a post to the forum before being approved as a user, with the goal being to help maintain a sense of community but also to help ensure that new users are legitimate and not the result of spam or hackers.

The Missouri Alliance for Historic Preservation, on whose board James served for several years, has set up the Missouri Bridge Preservation Fund in memory of James's dedication to historic bridges. The Alliance has asked that all contributions be sent to the Historic Bridge Foundation at 1500 Payne Ave., Austin, Texas, 78757. The alliance has a memorial page on James and you can visit it at <https://preservemo.org/remembering-our-friend-james-baughn/>.

If you have questions about the site or have discovered any technical problems or bugs on the website, please contact us at info@historicbridgefoundation.com.

Please do not leave messages on our Facebook page or the Bridgehunter Facebook page. You may also contact us at 512 407-8898.

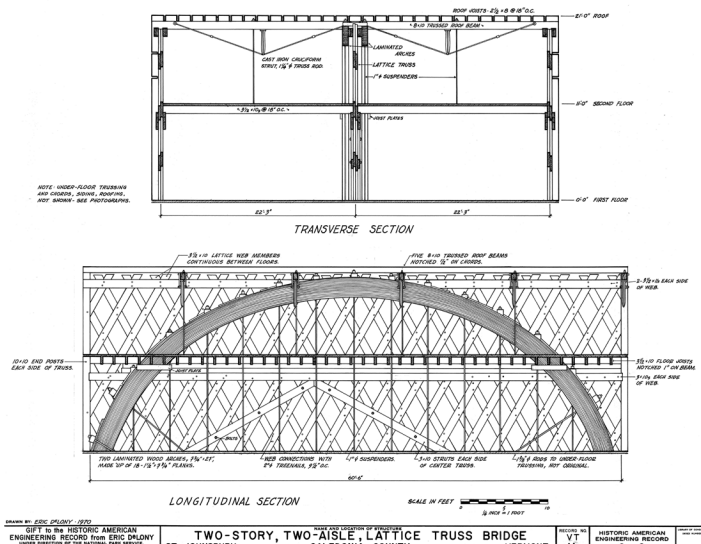
Kitty Henderson
Executive Director

First on the List: Early Bridge Surveys in the Historic American Engineering Record Collection

By Justin M. Spivey, PE, APT RP

Since the National Park Service's Historic American Engineering Record (HAER) was established in 1969, it has documented nearly three thousand bridges.¹ Many of these were added to the collection under Eric DeLony's leadership from 1971 to 2003, during which time he facilitated statewide historic bridge surveys in cooperation with state departments of transportation, studies of national park road systems, and the National Covered Bridges Recording Project with funding from the Federal Highway Administration. As a result, bridges comprise the majority of HAER survey numbers in some states.

For those not already familiar with HAER documentation, survey records are collected in the Prints and Photographs Division of the Library of Congress and largely available online. Each site or structure is assigned a unique survey number consisting of a two-letter postal abbreviation followed by a number assigned sequentially within each state or territory. Multiple structures within a given site typically receive the same survey number with an alphabetic suffix. For example, the E. & T. Fairbanks & Company complex in St. Johnsbury, Vermont, is HAER



E. & T. Fairbanks & Company, Two-Story Covered Bridge, St. Johnsbury, Vermont, delineated by Eric DeLony, 1970. Source: Library of Congress, Prints & Photographs Division, HAER VT,3-SAJON,1A.

No. VT-1 and its remarkable two-story covered bridge (in existence from 1876 to 1972) is VT-1-A.

HAER documentation typically includes large-format photographs with caption pages and/or written historical and descriptive data; a small percentage of surveys also have measured drawings. Written data ranges from one-page inventory forms to engineering and historical studies encompassing multiple structures, such as Clayton B. Fraser's treatise on George S. Morison's life and work, more than 500 pages filed under the Nebraska City Bridge (HAER No. NE-2). Other treasures hidden in the collection include interviews with witnesses to the construction of the Mott Rainbow Arch Bridge (HAER No. ND-1) in 1921, along with photographs taken during its demolition in 1982, and engineer Ward P. Webber's description of his design for the Kaibab Trail Suspension Bridge (HAER No. AZ-1), written shortly after its completion in 1928.

Although parsing the entire HAER collection of more than ten thousand records is a daunting task, an exploration of the lowest survey numbers in each state and territory reveals that bridges were documented early in the program's history regardless of the distance from headquarters in Washington, D.C. Bridges were assigned the first survey number in 12 states as far away as Idaho, and the second survey number in 11 more states as far away as Washington state. Except for manufacturing sites, no other type of



Demolition of Mott Rainbow Arch Bridge, Mott, North Dakota. Photo by Ismael J. Diede, 1982. Library of Congress, Prints & Photographs Division, HAER ND,21-MOTT,1--21.



Lacey V. Murrow Memorial Floating Bridge, Seattle, Washington. Photo by by Jet Lowe, 1993. Library of Congress, Prints & Photographs Division, HAER WASH,17-SEAT,13--2.

structure is as likely to have the lowest survey number assigned by HAER in a given state or territory.

This is not a precise analysis, as the rapid pace of documentation in HAER's first two decades meant that records were not always compiled at the same time or in the same order that survey numbers were assigned. For example, photographs and written data for the lowest survey number assigned to a bridge in Washington state (Lacey V. Murrow Memorial Floating Bridge, HAER No. WA-2) are dated 1993, whereas higher survey numbers have documentation dated as early as 1982. Some numbers were assigned and then withdrawn; for example, there is no HAER No. NV-1. Despite the known limitations of survey number order, the assignment of a low number seems to be a reliable indication that HAER believed a structure was worth documenting relatively early in the program's existence.

The first HAER projects included regional and statewide surveys of industrial and transportation heritage, which were not focused on bridges but documented them along with other significant structures. I spoke with Robert M. Vogel, former Curator of Mechanical and Civil Engineering at the Smithsonian Institution's National Museum of American History, who planned HAER's inaugural documentation project, the Mohawk–Hudson Area Survey, in 1969.² This survey covered multiple sites in its namesake region of New York as well as John A. Roebling's Delaware & Hudson Canal aqueduct spanning the Delaware River into Pennsylvania, which was assigned HAER No. PA-1. Neither Mr. Vogel nor

the HAER staff I consulted could say whether there was any intentionality in assigning other bridges the first survey number in their respective states, such as MD-1 for Wendel Bollman's Baltimore & Ohio Railroad bridge now at Savage, Maryland.

In addition to surveys completed by HAER staff, another important source of documentation is National Historic Preservation Act Section 106 mitigation for individual structures prior to their alteration or demolition. Section 106 mitigation is found in the lowest survey number assigned to a bridge in California (Moody Bridge, HAER No. CA-4), and every bridge documented in Delaware after the first two (on the Pennsylvania Railroad in Wilmington, HAER Nos. DE-12-B and DE-12-C).

Before its twentieth anniversary in 1989, the HAER collection included at least one bridge in the District of Columbia, Puerto Rico, and every state with the possible exceptions of South Dakota and New Mexico. South Dakota is something of a technicality, as the Chicago & North Western Railroad bridge across



Moody Bridge, Garberville vicinity, California, photographer and date unknown. Photo source: Library of Congress, Prints & Photographs Division, HAER CAL,12-GARB.V,1--1X.



Sioux City Bridge, Sioux City, Iowa, photographer unknown, circa 1889. . Photo source: Library of Congress, Prints & Photographs Division, HAER IA-96-2 (note SD-1-2 in the margin).

the Missouri River at Sioux City, Iowa, was assigned HAER No. SD-1 in 1986. Later research found that its western approach was not in North Sioux City, South Dakota, but in South Sioux City, Nebraska. In an impressive act of archival diligence, HAER moved the record to HAER No. IA-96 and included a cross-reference from its former location at SD-1. Among records currently available online, the lowest survey number assigned to a bridge in South Dakota seems to be HAER No. SD-51, an unnamed lattice truss from 1900 that was documented in 1997, near the end of HAER's third decade.

It also appears that no bridges in New Mexico were documented by HAER before the end of the twentieth century. This omission was capably amended with extensive documentation of the Denver & Rio Grande Railroad's Wolf Creek Trestle (HAER No. NM-16), albeit in 2010, more than four decades after HAER was established. The only other bridge documentation available in this state is Section 106 mitigation of a half-dozen remarkably similar concrete slab bridges on National Forest System roads in Gila National Forest, leaving much room for improvement.

The Library of Congress main catalog (<https://www.loc.gov/search/>) and Prints and Photographs Online Catalog (<https://www.loc.gov/pictures/collection/hh/>) provide increasingly powerful tools for exploring HABS, HAER, the Historic American Landscapes Survey (HALS), and other collections of historic images and data. HABS/HAER/HALS catalog records are being expanded to include more related names (original designers and documentation creators), dates, and keywords. Whereas optical character recognition (OCR) has been added for searching within older written data, newer records have written data exported directly to PDF. Other tools for exploration include a series of Wikipedia entries entitled "List of bridges documented by the Historic American Engineering Record in ..." various states and territories, which provide cross-references between Wikipedia articles and documentation on the Library of Congress website.

The author gratefully acknowledges the insight and assistance of HAER staff Justine Christianson and Christopher H. Marston in compiling this article.

Notes

¹ In some states, bridges have also been documented by the Historic American Buildings Survey (HABS), established in 1933. Although HABS has an architectural focus, it covered some sites of engineering interest before HAER was established 36 years later.

² For more information, see Christopher H. Marston's excellent article, "The Education of an Icon: An Interview with Robert M. Vogel," in *IA: The Journal of the Society of Industrial Archeology* 44, Nos. 1 and 2 (2018): 45–68, a special double issue celebrating HAER's fiftieth anniversary.

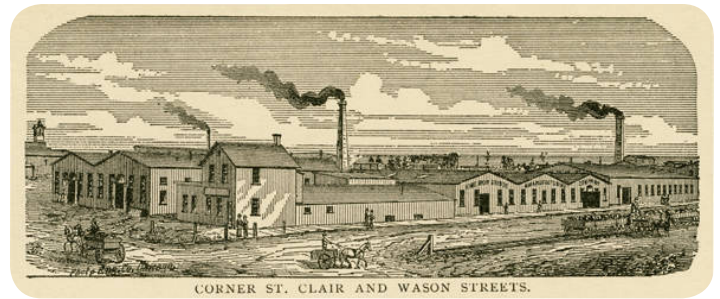
Justin M. Spivey, PE, APT RP, is a Senior Associate in the Philadelphia office of Wiss, Janney, Elstner Associates, Inc. While working for HAER between 1997 and 2001, he compiled documentation for hundreds of historic bridges, primarily in Illinois, Pennsylvania, and Texas. Historic bridges are a continuing professional interest, along with forensic engineering and rehabilitation, repair, and adaptive reuse of existing structures.

The Great Survivor: Restoration and Relocation of a King Bowstring Bridge

By Nels Raynor

In 1976, an inventory of bridges in Ohio found a surviving cast and wrought iron bowstring bridge built by the King Iron Bridge Company in Shelby County over Spring Creek on a private drive. Identified as the Brandewie Bridge after the owners of the property and bridge, this structure with its span of just over 72 feet stood out as an extremely rare surviving example of a King Bridge Company bowstring pony truss bridge in Ohio. At the time, the bridge was evaluated as being in “extremely poor” condition and endangered due to deterioration. However, this bridge managed to survive until a preservation project could be started in 2019. The owner of the bridge generously donated this historic bridge to the city of Sidney, Ohio, for reuse and preservation in Tawawa Park.

This bridge was built in 1879 as part of a two-span bridge over Loramie Creek about 320 feet east of where the current State Route 66 bridge is north of Fort Loramie. The bridge was originally painted in two colors, with the arch being a dark color and the decorative scrollwork being white. The Great Flood of 1913, which destroyed an enormous number of bridges in Ohio, severely damaged the abutments



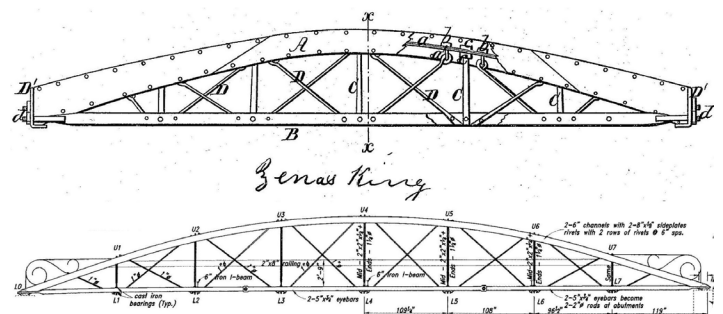
The works of the King Iron Bridge and Manufacturing Company in 1876.

of this bridge. As such, this bridge was ultimately replaced, however one span was sold to Bernard Brandewie and moved to his farm ca. 1915, where it crossed Spring Creek in a rural area west of Fort Loramie. Brandewie modified the bridge for use at his farm, including reducing the roadway width of the bridge from 16 feet to 12.5 feet. As part of this effort, the knee braces on one side were disconnected from the lower brackets and bent to refasten them to the 6” i-beams. The bridge was painted black sometime in the late 1960s. By 2020, the bridge was owned by Tim Hemmelgarn who donated the bridge for restoration and relocation to Tawawa Park in Sidney.

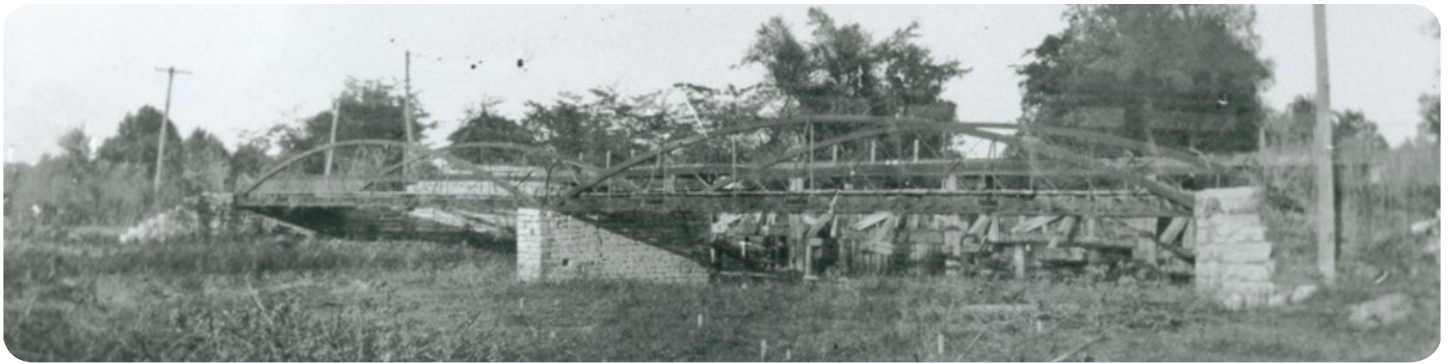
The bridge is an outstanding example of a pony truss bowstring bridge built to the patented design of the King Bridge Company of Cleveland, Ohio, which was known as the King Iron Bridge and Manufacturing Company at the time this bridge was built. Begun in 1858, the founder of the company was Zenas King (1818-1892) and under his direction the King Bridge Company became one of the largest bridge builders in the 19th century, and continued operating after his death into the 20th century under the direction of his sons, James A. King, Harry W. King, and Norman C. King. The company’s patented cast and wrought iron bowstring bridges marked the early success of



A portrait of Zenas King.



Above: A sketch of a bowstring bridge as depicted in the King bowstring bridge patent. Below: Elevation drawing of the bridge at Sidney today.



These photos show the bridge in its original location at Fort Loramie. The bridge sat next to a timber streetcar bridge. The bottom photo shows the bridge during the Great Flood of 1913, with the streetcar bridge in the foreground and the partially submerged bowstring bridge's diagonal members and top chord partly visible behind it.



The bridge as seen over Spring Creek at the start of the project. *Photo by Nels Raynor.*

the company, with examples built across many states, including distant states such as Texas. King patented the bowstring truss in 1861 and renewed the patent in 1867, and further improved the patent in 1874.

By the start of the project in 2019, the bridge had continued to deteriorate. Most of the timber deck had deteriorated and fallen off the bridge, damaging some of the lower lateral bracing in the process. The trusses themselves were also leaning slightly. Decorative ornamentation at the ends of the trusses was damaged and missing.



The bridge being lifted off of Spring Creek. *Photo by Nels Raynor.*

The restoration project began with the removal of the bridge from the farm. The bridge was carefully lifted off the waterway and set on the ground. From there, the bridge was non-destructively dismantled and loaded onto a truck where it was shipped to the Bach Steel shop in St. Johns, Michigan. One of the major shop repair tasks was the work on the top chord of the bowstring. The built-up chord consisted of 1/8" plate riveted to two channels forming a box. The plates had deteriorated and required replacement. The in-kind replacement involved removing the deteriorated plate and shop riveting new 1/8" plate back in place, and the work ensured that details such as splice plate locations were maintained. Bach Steel used hydraulic riveters (also called rivet squeezers) to install the new top chord rivets. Hydraulic riveters are less portable than the pneumatic rivet hammers used in the field, but are quieter, faster, and produce a consistent rivet with less effort on the part of the worker installing them.



New plate being riveted to the original channels of the top chord using a hydraulic riveter. *Photo by Nels Raynor.*



The repaired and painted bridge being prepared for shipping. *Photo by Nels Raynor.*

A number of truss members and braces had become bent, and required heat straightening. Missing lower lateral bracing was replaced. The bridge width was maintained from the 1915 alteration, however the floorbeams and knee braces were reconstructed to match the original design prior to the narrowing of the bridge. The decorative scrollwork at one corner of the bridge was repaired. The other four corners required replica scrollwork to be fabricated, matching the original design.

Following completion of repairs, the bridge was blasted and painted in a shop setting. Shop painting is less costly than painting in the field, and allows for all surfaces of each truss member to be fully painted, producing a better, longer lasting coating. A nod to the bridge's original two color paint system, the truss was painted green with the decorative scrollwork painted white.

The painted bridge was then shipped to its new home in Sidney, where a reverse of the disassembly took place, with the bridge being assembled on the

ground and then set on its new abutments over the water.

The restored bridge supports a Southern Yellow Pine timber walkway, providing a pedestrian crossing of Amos Lake in Sidney's Tawawa Park. Because of the low profile of a pony truss bridge, many modern hand railings would have obstructed the view of the historic bowstring trusses from trail users. For this bridge, this was addressed by using wire cable railings. These railings met modern code for pedestrian usage, but the lightweight nature of the cable (3/16" diameter cable) allows for viewing of the bowstring trusses behind the railing.

Bach Steel was the subcontractor in charge of the disassembly, restoration, painting, and reassembly. The prime contractor was R. G. Zachrich Construction. LJB was the consulting engineer in charge of overall coordination, design review, environmental studies, and project management. DAB Designs was responsible for the specialized historic bridge design. The project was completed at \$31,000 under budget.

Nels Raynor is president of Bach Steel, a steel fabricator and contractor located in St. Johns, Michigan, that specializes in hot riveting, heat straightening, and relocation and restoration of historic metal bridges. Raynor has several decades of experience working on historic bridges, is a certified welder, and has been working with steel since he was 19 years old.



The restored bridge reassembled in the park, prior to being set on the new abutments. *Photo by Nels Raynor.*

FROM RAILS TO TRAILS

The Making of America's Active Transportation Network

PETER HARNIK

"A spellbinding tale of the history of the rails-to trails movement, . . . Harnik's book gives us the inspiring story of local grit overcoming great odds for the changing benefit of all."—Charles N. Marshall, former officer of Conrail and Genesee & Wyoming railroads

"Peter Harnik captures the history of a movement that has provided so many pathways for people to commute, recreate, and enjoy nature. . . . I hope this story will inspire emerging generations to recognize the rights-of-way for future projects that benefit our communities."—Sally Jewell, former U.S. secretary of the interior and former CEO of REI

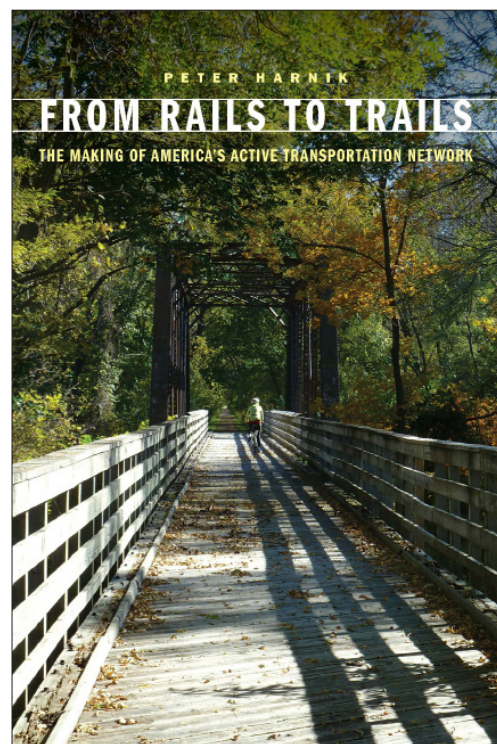
"A marvelous history. . . . This book tells a unique American tale—from deep in the heartland to New York City and Seattle—that will surprise and astonish you."—Ray LaHood, former U.S. secretary of transportation and former congressman

If, as Wallace Stegner said, the national park is "the best idea we ever had," the rail-trail is certainly a close runner-up. Part transportation corridor, part park, the rail-trail has revolutionized the way America creates high-quality, car-free pathways for bicyclists, runners, walkers, equestrians, and more.

It was only a few decades after railroad barons had run roughshod over America's economy and politics that they began to shed nearly one hundred thousand miles of unneeded railroad corridor. At the same time, bicyclists were being so thoroughly pushed off ever-more-intimidating roadways they came close to extinction. Through political organizing and lawyerly grit, an unlikely, formerly marginalized advocacy arose, seized on seemingly worthless strips of land, and created a resource that is treasured by millions of Americans today for recreation, purposeful travel, tourism, conservation, and historical interpretation.

From Rails to Trails is the fascinating tale of the rails-to-trails movement as well as a consideration of what the continued creation of rail-trails means for the future of Americans' health, nonmotorized transportation networks, and communities across the country.

Peter Harnik is cofounder of Rails-to-Trails Conservancy and founder of the Center for City Park Excellence at the Trust for Public Land. He is the author of *Urban Green: Innovative Parks for Resurgent Cities* and *Inside City Parks* as well as a former editor of both *Environmental Action* magazine and *Trailblazer* quarterly.



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