MEDINA RIVER BRIDGE
Texas Historic Bridges Recording Project
Spanning Medina River at Old Pleasanton Road
San Antonio Vicinity
Bexar County
Texas

HAER No. TX-52

BLACK AND WHITE PHOTOGRAPHY

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Department of the Interior
1849 C St., NW
Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD

MEDINA RIVER BRIDGE

HAER No. TX-52

Location:	Spanning Medina River at Old Pleasanton Road, San Antonio vicinity, Bexar County, Texas. UTM: 14/549500/3237160 USGS: Southton, Texas, quadrangle (1992).
Date of Construction:	1910.
Designer:	Terrell Bartlett, Inc., San Antonio, Texas.
Builder:	H. B. Thompson and Company, Birmingham, Alabama.
Present Owner:	Bexar County.
Present Use:	Out of service.
Significance:	This 303'-0"-long, four-span reinforced concrete arch bridge over the Medina River is one of the earliest documented concrete arch bridges in Texas. The bridge features open spandrels and two sets of ribs, and is probably the first bridge in Texas to feature this combination of material-saving devices. It was designed by the young engineer Terrell Bartlett, who would later earn commissions for engineering projects throughout the state. By the time of his death in 1962, Bartlett had become one of the state's most prolific engineers.
Historian:	J. Philip Gruen, August 1996.
Project Information:	This document was prepared as part of the Texas Historic Bridges Recording Project performed during the summer of 1996 by the Historic American Engineering Record (HAER). The project was co-sponsored by the Texas Department of Transportation (TxDOT).

Introduction

In 1910, when the four-span, four-arch reinforced concrete Medina River Bridge opened to traffic along a county road in Bexar County, Texas, just south of San Antonio, the use of reinforced concrete for roadway bridges in the U.S. was still in its formative stages.[1] In the state of Texas, reinforced concrete bridge construction was still in its embryonic stage. Today, many concrete arch bridges are among the best-known and most important bridges in Texas.[2] But the completion of a concrete arch bridge over the Medina River marked one of the initial uses of reinforced concrete arches for a Texas bridge design, the first time a Texas bridge featured parallel sets of concrete ribs, and the first time a Texas bridge featured both concrete ribs and open-spandrel arches.[3] The Medina River Bridge is also an excellent example of the work of Terrell Bartlett, a San Antonio native whose busy and lengthy career established him among the state's most prominent engineers.

Development of San Antonio

The bridge spans the Medina River, just past its confluence with Leon Creek, in a principally agricultural area of Bexar County. Once situated along Pleasanton Road approximately 3.9 miles south of Interstate 410 and twelve miles south of downtown San Antonio, the bridge has been bypassed by a new concrete structure and now spans the river between this and a wooden trestle for the Missouri Pacific Railroad. Just to the east is the tiny town of Cassin, population 500; one quarter of a mile to the north is Mitchell Lake, created by a

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[1] The first reinforced concrete arch bridge in the United States was Ernest L. Ransome's 1889 Alvord Lake Bridge in San Francisco's Golden Gate Park. While there were some large reinforced concrete arch bridges built in the east coast prior to 1910 — the Taft Memorial Bridge in Washington, D.C. (1908, HAER No. DC-6), and the Walnut Lane Bridge in Philadelphia (1908, HAER No. PA-504) most prominent among them — it was not until well into the second decade of the twentieth century that reinforced concrete arch bridges became common American bridge types.

[2] In addition to the Congress Street Bridge over the Colorado River in Austin, finished in early 1910, these include the Galveston Causeway over the Galveston Bay in Galveston (1912, HAER No. TX-37), the Dallas-Oak Cliff Viaduct over the Trinity River in Dallas (1912, HAER No. TX-33), the San Jacinto Street Bridge over Buffalo Bayou in Houston (1914), the Guadalupe River Bridge in New Braunfels (1936), and the Lamar Street Bridge over the Colorado River in Austin (1942).

[3] Parallel sets of ribs were built into other American bridges in the early 1900s, but mostly in the eastern part of the country. See Carl Condit, *American Building Art: The Twentieth Century* (New York: Oxford University Press, 1961), pp. 196-98.

dam along a tributary of the Medina River; and not far to the northwest are the missions of La Espada and San Juan Capistrano, two of the five missions established by Spanish settlers in the first half of the eighteenth century, and two of the oldest extant buildings in the southwestern United States.

The first Anglo-Americans arrived in the Spanish-controlled area after 1821, making San Antonio at one time the westernmost point of settlement along the frontier. Yet independence from Spain in 1821 gave Mexico control over the area, which it asserted in the victory over the self-proclaimed Texans in the 1836 battle of the Alamo. When the Texans gained legal rights to the land following their defeat of Santa Anna and his Mexican troops in the battle of San Jacinto that same year, San Antonio became the Bexar County seat and settlement and development proceeded rapidly. By 1900, military bases, flour mills, foundries, breweries, and five railroads had made San Antonio the state's most populous city.[4]

The effects of San Antonio's booming industries were felt outside of the city as well as in. To the immediate south, the farmland surrounding the Medina River benefitted from the coming of the railroads — particularly the San Antonio, Uvalde, and Gulf Railroad, which extended a track in 1912 from the town of Fowlerton, far north of San Antonio, to Pleasanton, to the south. For the most part, the track paralleled Pleasanton Road, a newly paved highway that also stretched to Pleasanton.[5] In 1913, a flag stop was included at Cassin, a small farming community settled just before the turn of the century. The railroad stop allowed the area's abundant supply of cotton and bermuda onions to be conveniently shipped throughout the region and the state.

The growth of tourism in San Antonio also contributed to the prosperity of the city's outskirts. With visitors drawn to the Alamo, the other missions, and particularly the mild winter climate, tourism had become one of the city's leading industries by the turn of the century.[6] The Hot Sulphur Wells, south of the city and to the northwest of Cassin, also contributed to this industry. Visitors and dignitaries came from the midwest and the east coast to visit the wells and to stay at the spa and luxurious hotel. Some of these visitors eventually became part of the city's

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[4] Population in 1900 reached 53,321, putting San Antonio ahead of Galveston.

[5] The railroad opened as the Crystal City and Uvalde Railroad Company in 1909, but changed its name to the San Antonio, Uvalde, and Gulf Railroad in 1912. The expansion of its track mileage actually weakened the company, and on December 1, 1925, it was purchased by the New Orleans, Texas, and Mexico Railway Company. In 1956, that company merged with the Missouri-Pacific. See Ron Tyler, ed., *The New Handbook of Texas,* vol. 5 (Austin: Texas State Historical Association), p. 814.

[6] Tyler, ed., *The New Handbook of Texas,* vol. 1, p. 520. For promotions of the city along these lines in the early twentieth century, see W. S. Wilson, ed., *San Antonio Booster's Guide Book* (San Antonio: San Antonio Light, 1924).

permanent population, and this influx spurred an unprecedented building boom in San Antonio.[7] In an eight-month period from January to August 1910 — during the Medina River Bridge's construction — over $2.2 million went into the erection of more than 2,500 buildings in the city.[8]

The development of new infrastructure also attempted to maintain pace with the population growth and the building industry. With automobiles gaining in popularity by 1910, the paving of new roadways became essential. By the mid-1920s, a visitor's guide to San Antonio boasted that "only one other county has greater paved road mileage than Bexar," adding that nineteen "hard-surfaced" highways radiate from the city from which the motorist "speeds away to enchanting picnic spots, to quaint villages in the hills or rich farmlands along the rivers."[9] Before the construction of Interstates 35 and 37 and U.S. Route 281, Pleasanton Road was one of four principal roads leading south and southwest out of San Antonio.[10]

It is likely that the Medina River Bridge, as part of one of these newly paved roads outside the city, was needed initially to aid the transport of agricultural products and people to and from the towns of Cassin, Buena Vista, Losoya, Leming, and Pleasanton to the railroad depots in San Antonio. Once the railroad extended south to Pleasanton by 1912, the bridge made it convenient for farmers to access the flag stop at Cassin. It may have also eased the movement of tourists to the various spots of interest in the county. Prior to its construction, people simply forded the river whatever way they could in order to move across.[11]

Terrell Bartlett

The need for a bridge was apparently pressing enough that the Bexar County commissioners obtained its funding without a bond issue, and hired Terrell Bartlett and his

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[7] Ibid., p. 520. See also Nancy Perdue, "Bridge May Link Spa, Park," *San Antonio Light,* 24 July 1986, p. B-3; "Many San Antonio City Builders Tell Why Fall of 1910 and Spring of 1911 Will Be Greatest in History of City's Growth; Specific Reasons," *San Antonio Light and Gazette,* 18 September 1910.

[8] "2526 New Buildings Erected in San Antonio in Past 8 Months," *San Antonio Light and Gazette,* 4 September 1910.

[9] Wilson.

[10] *Bexar County Highway League's Official Log Book for Texas 1914-1915: A Touring Hand Book of the Principal Automobile Routes in the State of Texas* (San Antonio: D. E. Colp, 1914). Other major roads leading south and southwest from San Antonio included Corpus Christi Road (now old Corpus Christi Road) and Goliad Road.

[11] "Medina Bridge Ought to Have Opened July 4," *San Antonio Light and Gazette,* 5 July 1910, p. 8.

company to design it. Bartlett drew up the specifications and the contract in November 1909 for a "Reinforced Concrete Highway Bridge at Pleasanton Road Crossing of Medina River," and the commissioners determined that the bridge should be completed on July 4, 1910.

The Medina River Bridge was one of the earliest commissions for Bartlett, and probably his first bridge project. Born in San Antonio on July 26, 1885, Bartlett earned a degree in civil engineering from the Massachusetts Institute of Technology in 1906, and then returned to San Antonio in 1908 to begin his own practice as a civil engineer at the age of twenty-two or twenty-three. He had already worked with U.S. Army Corps of Engineers, the Pennsylvania Railroad, and played an important role in the construction of the Detroit river tunnel of the Michigan Central and other railways.

Sometime around 1910, Bartlett formed an engineering consulting partnership with someone named Ranney, and during the next twelve years the firm was engaged in a number of projects in and around San Antonio, including the Medina Dam and Irrigation Project (1911-1912), a decorative concrete bridge over the San Antonio River at Navarro Street (now part of the famous Paseo del Rio), and the Corpus Christi Causeway. The firm also worked on municipal and industrial plants and improvements, in addition to highway construction. In 1923, Bartlett designed the graceful, arched two-ribbed Comal River Bridge with an ornamental railing in New Braunfels. In the late 1930s, Bartlett was selected as the consulting engineer for the new Galveston Causeway, connecting Galveston Island to Virginia Point on the Texas mainland.

In 1944, Bartlett formed a new partnership with A. M. Erskine, who had worked with Bartlett's company since the 1920s. When Bartlett died on August 25, 1962, at the age of seventy-seven, his list of accomplishments also included the master plan for San Antonio's storm drainage system, construction supervision for the Hondo Air Base, and a citation for distinguished service from the Bexar Chapter of the Texas Society of Professional Engineers, a society for which he served as president in 1928.[12]

Construction of Medina River Bridge

On January 20, 1910, the commissioners opened the bids for the Medina River Bridge project and selected the Birmingham, Alabama-based contractors H. B. Thompson and

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[12] Other projects carried out by Bartlett during his career include the Frio River Project, the LaPryor-Nueces Valley Irrigation Project, the Elephant Butte Dam, the Longhorn Cement Company, bridges over the Rio Grande and Guadalupe Rivers in Texas, and bridges over the Calcasieu River in Louisiana. For most of his professional career, Bartlett's firm occupied space in the Smith-Young Tower (now the Tower Life Building), one of San Antonio's most distinctive skyscrapers and distinguished addresses. See "Who's Who in Texas and Why?" (vertical files, Eugene C. Barker Center for American History, University of Texas at Austin, Austin, Texas); "Career Varied of Consulting Engineer on New Causeway," *Galveston Daily News,* 15 August 1939; and "Funeral Held for Bartlett," *San Antonio Light,* 27 August 1962, p. 20.

Company, whose $23,350.00 offer was the lowest.[13] Upon selection, H. B. Thompson and Company, at the time preoccupied with a "large concrete contract" for the U.S. War Department in Pensacola, Florida, asked to extend the date of completion to August 4, 1910, for the purposes of allowing the poured concrete in each part of the bridge to attain greater strength.[14] The commissioners, however, stuck with the original July 4 completion date so that the bridge could open in conjunction with an Independence Day celebration and a barbeque.[15]

Construction began on or around February 5, 1910.[16] In the early spring, the flow of the Medina River had become unusually fierce due to heavy rains, and work was suspended on the bridge for as long as a week or ten days at a time. By July 4, 1910, the bridge was still very much under construction, although it should have been finished according to the stipulations of the contract. A county engineer working on the project at the time said it would be completed "sometime" in September 1910.[17] It was not until January 24, 1911, however, that the Bexar County Commissioners made their final inspection, so it can only be definitively determined that the bridge opened to traffic between late July 1910, and late January 1911.[18] Upon completion, this bridge became the first permanent span over the river at this location.

Description

The 303'-0"-long four-span structure consists of a central pier and two adjacent abutments supporting two 110'-0"-span two-ribbed arches, with 29'-0"-span arches on either end terminating

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[13] The bids for the project, from lowest to highest, were as follows: H. B. Thompson and Company, $23,350.00; P. T. Shields, $24,885.00; Otto P. Kroeger and Company, $27,000.00; William P. Carmichael Company, $29,869.89; Kelley and Ferguson and Company, $29,891.05; Aiken Cement Company, $37,737.00; and Midland Bridge Company, $52,880.00. See Bexar County, *Commissioners' Court Minutes,* vol. R (Bexar County Courthouse, San Antonio, Texas), p. 90 (20 January 1910).

[14] H. B. Thompson, letter to the "Honorable Judge and Commissioners Court of Bexar County," in *Commissioners' Court Minutes,* vol. R, p. 92 (21 January 1910).

[15] "Medina Bridge," p. 8.

[16] While no official date for the beginning of construction has been found, the contract specified that work had to commence within fifteen days of the contracts' execution. Approval of the contract came on January 21, 1910. *Commissioners' Court Minutes,* vol. R, p. 303 (24 January 1911).

[17] "Medina Bridge," p. 8.

[18] *Commissioners' Court Minutes,* vol. R, p. 303 (24 January 1911).

in earth-fill approach abutments.[19] The main abutments and piers are made of concrete mortar embedded with large rubble stones resting on wooden piles driven vertically to bedrock. The pilings for the approach abutments are 20'-0" long, and taper from 18" in diameter to 8" at the lower end. The parts of the superstructure (including the spandrels, floor system, and railings) are also made of concrete, poured over standard twisted square medium steel bars with ultimate tensile strength from sixty to seventy thousand pounds per square inch.

The arches feature open-spandrel construction. The wedge-shaped tops of the spandrels extend outward slightly to the edge of the roadway. These, in turn, support a reinforced slab floor system and a two-lane, 18'-2"-wide roadway on a 19'-5" deck flanked by tall concrete railings with block patterning on the outside.[20]

Reinforced Concrete Bridges in Texas

The Medina River Bridge helped establish a precedent for reinforced concrete arch bridge design in Texas. It was not only the first reinforced concrete arch bridge in Texas, but it was also one of the earliest bridges in the state to feature an open-spandrel design, the first bridge in the state to include ribbed arches, and also the first to feature the combination of open-spandrels and ribbed arches, which became common for reinforced concrete arch bridges by the 1930s.

The earliest documented concrete arch bridge in Texas is a small, one-span structure, over a tributary of Turtle Creek in Dallas County, built in 1908. This bridge, however, is a closed-spandrel concrete structure with a barrel vault. The invention of open spandrels to carry the arches — made possible by steel reinforcement — lessened the amount of material necessary and thereby helped reduce overall costs. While open-spandrel designs had been used on a handful of bridges around the U.S. prior to 1910 — most notably for the 1908 Taft Memorial Bridge in Washington D.C. (HAER No. DC-6) — in Texas both the Medina River Bridge and Austin's Congress Avenue Bridge introduced this feature concurrently when they opened at the beginning of the twentieth century's second decade.[21]

The Congress Avenue Bridge, designed by the Kansas firm of Waddell and Harrington, built by the William P. Carmichael Company of Williamsport, Indiana, and St. Louis, Missouri, and finished in February of 1910, featured eight, 110'-9"-span barrel arches with spandrels carrying a roadway with open-style concrete railings. While the arches and spandrels remain, they have not served in a structural capacity since 1975, when the highway department began a five-year project that placed prestressed-concrete box girders from pier to pier, alleviating most

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[19] The specifications called for a 342'-0"-long structure, but this distance includes the approaches made of earth fills.

[20] *Commissioners' Court Minutes,* vol. R, 1909 Special.

[21] While the Taft Memorial Bridge includes reinforced concrete spandrels, its principal arches lack steel reinforcement.

of the weight from the arches. Metal railings have also replaced the original open-style concrete ones.[22] Although this bridge was completed before the Medina River Bridge, its reconstruction makes the latter the oldest intact open-spandrel concrete arch bridge in Texas.

The growing use of steel reinforcement for bridges at this time allowed for the elimination of bulky barrel arches and their replacement with parallel sets of concrete ribs. Rib arch technology was first employed in the U.S. in 1898 by F. W. Patterson, an engineer working with the Department of Public Roads in Allegheny County, Pennsylvania, and it probably reached its most refined and graceful American application in the 1930s Oregon bridgework of Conde B. McCullough.

Bartlett introduced the rib arch technology to Texas in his design for the Medina River Bridge. He combined the ribs with the open spandrels to design the first Texas bridge with both of these features, and it remained the only Texas bridge of this type until the 1914 completion of the Paddock Viaduct in Fort Worth. Interestingly, despite the availability of ribbed-arch technology, many of the concrete arch bridges in Texas built over the next ten years were of the barrel arch type, most notably the giant Dallas-Oak Cliff Viaduct of 1912. Four years after the completion of the Medina River Bridge, Bartlett designed the closed-spandrel, barrel-arched reinforced concrete Berg's Mill Bridge over Leon Creek only a few miles to the north.

Despite its structural capabilities, the slow evolution of concrete arch design could be attributed both to its relatively high cost (compared to steel alone) and to the resistance of conventional American tastes to this still relatively new material. When concrete was first used as a material to build bridges, it was commonplace for designers and engineers to either sheath their concrete structures with a layer of stone, or to incorporate familiar motifs, such as voussoirs, capitals, or keystones. With only a few exceptions, most concrete bridges prior to 1910 were decorated in this fashion.[23]

It could be argued that the wedge-shaped concrete slabs that cap the spandrels and help support the deck and the block patterns of the railing (which consist of little more than a squared-off layer of concrete protruding from the railing in evenly spaced intervals), are attempts to appeal to traditional tastes. Yet there is little — if any — ornamentation on the rest of the bridge, where every element has a structural purpose. The evenly spaced spandrel columns of the arches and the parallel sets of bending ribs — the bridge's most distinctive features — are also supporting members.

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[22] T. Lindsay Baker, *Building the Lone Star: An Illustrated Guide to Historic Sites* (College Station: Texas A&M Press, 1986), pp. 39-42.

[23] See, for example, Carl Condit, *American Building Art: The Nineteenth Century* (New York: The Oxford University Press, 1960), pp. 252-53; Eric DeLony, *Landmark American Bridges* (New York: American Society of Civil Engineers, 1993), p. 109; or David Plowden, *Bridges: Spans of North America* (New York: Viking Press, 1974), p. 299.

However, while these structural members undeniably lend a certain visual power to the overall structure, they also convey a sense of lightness and elegance. The steeply-pitched banks of the Medina River at this site make the bridge's presence particularly dramatic, as it extends high over the slow moving river.[24] Thus, Bartlett, intentionally or not, managed to wed structure and function with beauty in this work of 1910.

In 1910 it was revolutionary to build a reinforced concrete bridge of any design in Bexar County — let alone with open spandrels and ribs — and the construction of the Medina River Bridge may have spurred an acceptance of this material for bridges county-wide. During the bridge's construction, the city of San Antonio awarded a contract to the Leversedge Bridge Company to build a one-span, 100'-0"-long reinforced concrete bridge over the San Antonio River on Travis Street. That bridge was to replace an old iron bridge, and the use of concrete for bridge construction in this case was considered an "experiment" for the city, which prior to that time did not have any concrete bridges.[25]

The use of concrete for the Medina River Bridge also paralleled a greater acceptance of the material for the entire built environment of San Antonio around 1910. It was during this time that construction of the first reinforced concrete school building in the southwestern U.S. was underway in San Antonio, and there were many other buildings under construction, both public and private, that employed this material. The widespread use of reinforced concrete in 1910 was deemed significant enough to merit nearly weekly articles in the pages of the *San Antonio Light and Gazette* and the *San Antonio Daily Express.*[26]

Conclusion

While Austin's heavily trafficked Congress Avenue Bridge merited upkeep and a major reconstruction over the years, the considerably lesser-traveled Medina River Bridge began a slow and seemingly irreversible period of decline. Because its 18'-2"-wide roadway was initially designed for two lanes of traffic, the bridge by the 1970s had long since been able to comfortably handle passing vehicles. In 1973, *San Antonio Light* columnist Joe P. Faulkner included the

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[24] Its height in July 1996, during a prolonged Texas drought, was at least 100 feet.

[25] The Medina River Bridge is located outside the San Antonio city limits.

[26] See, for example,"Concrete Bridge May be Order Here," *San Antonio Light and Gazette,* 8 August 1910, p. 9; "Bridge Will Be Concrete: New Type of Structure to Span River at Travis Street," *San Antonio Daily Express,* 5 August 1910, p. 14; or "First Fireproof School Building in Southwest is in Course of Construction in San Antonio: West Texas Military Academy to Be Built Entirely of Reinforced Concrete," *San Antonio Light and Gazette,* 14 August 1910.

bridge among those which were "inviting death" along Bexar County roadways.[27] A photograph reproduced with this article showed visible cracks in the railing and the roadway.

The bridge eventually closed to traffic, and a new concrete girder bridge meeting current safety regulations bypassed the old bridge to its east. Today, loose iron screws extend from the railing and moss, weeds, trees, grow on and around the cracking roadway. Now a shadow of its former self, the Medina River Bridge is gradually being swallowed by the natural environment in which it was built.

Yet the Medina River Bridge is integral, if not seminal, to the emergence of a concrete arch bridge tradition within Texas. Its combined use of reinforced concrete, open spandrels, and parallel sets of ribs provided a regional breakthrough. It was also probably one of the first major commissions for engineer Terrell Bartlett, whose varied and prolific career established him among the preeminent engineers in the history of Texas. In an age when so many older, out-of-service bridges of architectural and engineering merit are often bypassed by the most economical — and generally most mundane — means, the Medina River Bridge represents the early stages of reinforced concrete arched bridge design in Texas and the United States, when aesthetic considerations were still linked with those of structure and function.

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[27] Joe P. Faulkner, "The Killer Bridges: Outdated Spans Invite Death," *San Antonio Light,* 27 May 1973.

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APPENDIX: Suggestions for Further Research

Some questions concerning the Medina River Bridge arose during the research and writing of this report. Some of these questions, due to limitations in the scope of the Texas Historic Bridges Recording Project, remain unanswered. It is suggested that scholars interested in this bridge consider pursuing the following:

1. What influenced Bartlett's design for the bridge?

2. Was Bartlett aware of Waddell and Harrington's design for Austin's Congress Avenue Bridge?

3. Why was there virtually no upkeep on the bridge over the years?

4. When exactly did the bridge open to traffic?

5. When was the Medina River Bridge officially closed to vehicular traffic?