

“HISTORY OF THE GLASGOW BRIDGE”
by Thomas Gubbels
Design Division, Missouri Department of Transportation
August 2007

The Glasgow Bridge is located on Missouri State Route 240 over the Missouri River at Glasgow, Howard County, Missouri. Bridge construction began in 1923 and was completed in 1925.

This bridge is an excellent example of a large-scale, multi-span truss bridge representing standard designs and construction procedures used during the early years of the Missouri State Highway Department. The Glasgow Bridge is approximately 2,224' long, and it features five Pennsylvania through-truss spans and seven Pratt deck-truss approach spans. This was one of several bridges across the Missouri River built by the Missouri State Highway Department in the early 1920s, and it has changed little since it opened to traffic in 1925.

Historic Background - The City of Glasgow

Glasgow is a small community on the western edge of Howard County. Howard County experienced a rapid influx of settlers from southern states such as Kentucky, Virginia, and Tennessee in the early decades of the nineteenth century, and local leaders realized that a port city on the Missouri River was needed to provide a shipping point for the county's agricultural exports. Thus, thirteen businessmen joined together in the fall of 1836 to plat a town on the banks of the Missouri River. The new community was named Glasgow after James Glasgow, an early Howard County settler, and the town quickly became a major shipping point for steamboat traffic along the Missouri River.

Glasgow was located immediately adjacent to the Missouri River, and steamboats along the river regularly docked at the port of Glasgow to drop off imports from throughout the country and to pick up loads of tobacco for export to St. Louis, New Orleans, and beyond. Records from 1848 indicate that approximately 500 steamboats docked at the city of Glasgow over the course of the year.

Glasgow's leaders hoped that the community would remain a commercial center in the aftermath of the Civil War, but the emergence of a new transportation method threatened the community's survival. Steamboats continued to traverse the Missouri River, but railroad systems offered a viable transportation alternative. It soon became cheaper for farmers to ship their crops to outside markets via the railroad rather than by river.

In an effort to attract rail connections to the area, Howard County voters approved bonds to support the construction of new lines through the county. Two railroad companies took advantage of this offer and constructed lines connecting Glasgow to a nationwide rail network. In 1874, the Wabash Railroad built a spur line between Salisbury, a rural support community in Chariton County, and Glasgow. The Chicago and Alton Railroad constructed a line connecting St. Louis and Chicago and in the 1870s the company was looking to expand westward into central Missouri and beyond. To this end the Chicago and Alton began work in the mid-1870s on an expansion of their line that would run from Mexico in Audrain County to Glasgow. This branch line reached Glasgow in 1878, providing yet another transportation option for local residents. Numerous grain bins and other storage facilities were quickly built beside the new rail lines at Glasgow, and the presence of these two railroads allowed Glasgow to maintain its status as a commercial center.

Kansas City was rapidly emerging in the late nineteenth century as a commercial hub comparable to St. Louis or Chicago, and the Chicago and Alton Railroad considered expansion into the city as critical to its survival. In order to extend their lines into Kansas City, the Chicago and Alton Railroad decided to construct a bridge across the Missouri River at Glasgow. Construction work on the Chicago and Alton Bridge at Glasgow began in May 1878 and the structure opened in June 1879. This was the first all-steel bridge ever built. The Chicago and Alton railroad bridge was reconstructed in 1899. Rail traffic continues today along the former Chicago and Alton railroad line at Glasgow under the auspices of the Kansas City Southern Railroad, but railroads no longer serve as the primary means of transportation for local residents.

Glasgow remained a prosperous commercial center at the beginning of the twentieth century thanks to its access to two national railroad systems and a stable agricultural economy. Glasgow was the home to two colleges, numerous churches, and a wide variety of businesses. The community featured two railroad depots and a busy riverfront where grain and other agricultural goods were stored and shipped to outside markets. The automobile was beginning to emerge as the preferred form of personal transportation, and rumblings were heard for an improved transportation system.

Seeking a River Bridge for Glasgow

Prior to 1907, county governments controlled road and bridge building in Missouri. Individual counties decided how much money to spend on road construction, and taxes were levied at the local level for road and bridge maintenance. Unfortunately, this led to a jumbled system of uncoordinated roads, and local governments could not raise sufficient funds to finance major projects such as bridging the Missouri River.

This situation began to change in 1907 when the Missouri General Assembly appointed a State Road Engineer and in 1913 with the creation of the Missouri State Highway Department. Several campaigns were conducted to convince Missourians to support statewide road construction, culminating in the 1921 passage of the Centennial Road Law. The Centennial Road Law created a centralized highway commission to coordinate the construction of a statewide road system linking Missouri's county seats that would be paid for using federal and state funds. The Centennial Road Law also allowed the highway commission to build cross-state highways linking Missouri's major metropolitan areas. Supported by a \$60 million bond issue approved by voters in 1920, the Missouri State Highway Commission began building hard-surfaced state highways throughout the state. By 1930, Missouri's basic highway system was approximately 70 percent complete, and paved or graded state highways had been built in every county.

As automobile ownership increased in the twentieth century, Glasgow residents quickly realized that their community needed to be attached to a high-quality road system if it was to remain a commercial center. As part of this road system, a bridge was needed to carry automobiles across the Missouri River. Numerous ferries operated at the Glasgow wharf in the early twentieth century, providing a way to transport both wagons and automobiles across the river. These ferries did not operate during the cold Missouri winters or after sunset, making them an unreliable transportation resource. Clearly some type of bridge needed to be built at Glasgow, and local leaders began to advocate for the construction of such a structure in the early 1920s.

Although Glasgow's bridge advocates were rebuffed in their effort to attach a vehicular crossing to the Chicago and Alton Railroad Bridge, they continued to seek funding for a new bridge across the Missouri River. In the spring of 1921 the campaign for a new bridge at Glasgow took

on an added sense of urgency when a group of businessmen from nearby Boonville, Missouri, announced that they had pledged \$100,000 for the construction of a toll bridge across the Missouri River at their town that would be integrated into the National Old Trails Highway. Glasgow's leaders realized that if a bridge was built at Boonville it was unlikely that either a privately marked highway or a major state highway would be routed through their community.

In response to this potential threat, Glasgow's leaders began soliciting private funds to build a vehicular bridge. In May 1921 a delegation met with the Missouri State Highway Board. The delegation suggested that the highway board consider expanding the road that ran from Fayette to Glasgow across the Missouri River into Saline County through the cities of Gilliam, Slater, and Marshall. The delegation informed the highway board that local residents had pledged over \$400,000 to pay for a river bridge at Glasgow, and they promised that if the state built an improved highway through Howard and Saline Counties, the bridge would be built to link together the new roads. The highway board thanked the group for their interest, but the board said it was not authorized to approve the construction of any additional state highways through Saline County. The Missouri State Highway Board had very limited powers, but the Missouri General Assembly soon passed a law that dramatically expanded the state's highway system and paved the way for the construction of a new bridge at Glasgow.

Late in the summer of 1921, the Missouri General Assembly passed the Centennial Road Law, marking the final step in the transition from local to state control over road construction. It created a four-member Missouri State Highway Commission with broad powers to locate, design, construct, and maintain the state highway system, let contracts, and purchase rights of way. The new law detailed a 1,500-mile system of primary routes to be comprised of hard surfaced roads connecting Missouri's principal cities. It also explicitly defined a secondary system of 6,100 miles, chiefly of graded earth and gravel, linking all of Missouri's county seats. The law mandated that highway construction be carried on simultaneously as far as possible in all counties, and it offered new hope to the supporters of a river bridge at Glasgow.

In April 1922 representatives from Saline and Howard Counties traveled to Jefferson City to meet with the recently created Missouri State Highway Commission. The delegation told the highway commission that local residents were willing to pay for half the costs needed to build a bridge across the Missouri River. The Missouri State Highway Commission was amenable to this proposal, but the commission refused to formally endorse construction of the bridge until local voters approved their share of the financing. Engineers with the Missouri State Highway Department estimated that the Glasgow Bridge would cost approximately \$400,000 to build, and unless local funds were raised to pay for half the total by the end of 1922, the project would be scrapped.

A petition requesting a \$100,000 bond issue was presented to the Howard County Court, and an election was set for May 26, 1922. Campaign committees were organized in each township, and bridge boosters used postcards, posters, circulars, and newspaper advertisements to spread their message. One of the primary arguments presented by bridge advocates was the idea that Howard County would receive enormous economic and social benefits for a relatively small investment. To finance the bond issue, Howard County residents were told that their property taxes would likely need to be increased only \$3 per every \$1,000 of assessed value. In exchange, a new bridge would be built that would benefit the entire county. In addition, construction of the bridge would likely lead to the construction of two or more new state highways through the county, improving transportation and providing additional jobs. Bridge advocates also pointed out that Howard County residents were going to supply tax money to the Missouri State Highway Commission regardless of whether or not the bridge was built, and thus the Glasgow Bridge

represented an opportunity for county residents to get a fair return on their state taxes. Finally, bridge boosters appealed to voters' emotions, promising "success means progress and prosperity for all," while "failure means isolation and perhaps stagnation."

When local polling places opened on May 26, 1922, large numbers of Howard County voters came to cast their vote. Observers noted that people were waiting in line even before the polls opened and that large numbers of women voters participated in the election. When the votes were totaled, the bond issue passed by a margin of 5,304 in favor to 1,140 opposed. The bond issue found strong support in Glasgow and Fayette, the county seat, but it was strongly opposed in New Franklin. Many New Franklin residents had purchased stock in the privately financed Boonville Bridge, and the proposed structure at Boonville would empty into their community. New Franklin voters thus voted against the bridge at Glasgow by a 721 to 49 margin, but this local opposition was not strong enough to overcome general countywide support for the Glasgow Bridge. The local Glasgow newspaper celebrated the triumph of the bridge bond issue, happily noting that the election represented "a perfect union of thought working as nicely as 10,000 bees in a hive." However, the newspaper also warned that unless Saline County residents also passed a bond issue, the financing for the proposed Glasgow Bridge would fall apart and a great opportunity for progress would come to nothing.

The campaign to win approval for a bond issue for the Glasgow Bridge followed a similar pattern in Saline County. In May 1922 a petition signed by 637 residents was presented to the Saline County Court asking them to issue bonds worth \$300,000 to support construction of bridges across the Missouri River at Glasgow and Miami. The county court approved the petition and set a countywide election for June 2, 1922. Saline County bridge backers met soon afterwards at both Marshall and Slater to develop a strategy to win over local voters. Bridge supporters bought advertisements in local newspapers, spoke to local community groups, and posted fliers calling upon local citizens to support the bridge bonds. Appeals were made to voters' emotions, stating that patriotic, progressive citizens had a civic duty to support the bridge bonds. The bridge bonds also offered a tremendous bargain for Saline County residents. The bonds would be issued for twenty years at a maximum rate of five percent, meaning that the owner of an 80-acre farm would see his annual taxes increase by no more than \$1.60. As a local newspaper pointed out, a Saline County resident could, "cut off a few cigars, a few drinks, a few boxes of face powder, or a few picture shows, pay the whole bill and not even know it."

When the election returns were tallied, Saline County voters overwhelmingly approved the bond issue by a vote of 5,515 in favor to 1,823 opposed. The bond issue was strongly supported in Marshall, the county seat, and in towns along the likely route of a state highway leading to the Glasgow Bridge such as Slater and Gilliam. However, voters in smaller Saline County towns such as Arrow Rock voted against the bridge bonds believing that they would see no benefit from the new structure, as did voters in towns such as Grand Pass and Malta Bend that were located near the site of another proposed bridge across the Missouri River at Waverly. Still, the bond issue passed by a sizeable margin, and the stage was set for work to begin on designing a river bridge at Glasgow.

Once local financial support for the Glasgow Bridge had been secured, the Missouri State Highway Department began the process of designing the new structure. The highway commission agreed to seek federal aid to pay for its half of the construction costs, and Fred Adgate, a consulting engineer who worked for the Foundation Company in Chicago, Illinois, was hired to draw up blueprints for the new structure. By the fall of 1922 Adgate had completed preliminary plans for the Glasgow Bridge.

While Fred Adgate worked on the blueprints for the Glasgow Bridge, officials with the Missouri State Highway Department approached the United States Bureau of Public Roads seeking federal approval for the new structure. Since federal money would be used to pay for the highway department's portion of construction costs, federal engineers with the Bureau of Public Roads had to approve the basic design and layout of the Glasgow Bridge.

The highway department let contracts for the construction of the Glasgow Bridge in December 1922 without having formal federal approval for the new structure. Fortunately, the Bureau of Public Roads gave its blessing to the final design for the Glasgow Bridge in February 1923, and construction of the new bridge was allowed to proceed.

On December 16, 1922, the Missouri State Highway Department formally opened the bids received to build the Glasgow Bridge. The highway department allowed construction contractors to offer bids for the construction of the entire bridge or separate bids for the bridge substructure and superstructure. The lowest bids received came from the Union Bridge and Construction Company and the Mt. Vernon Bridge Company. Two weeks later the Missouri State Highway Commission awarded construction contracts to these two companies. A ten percent contingency fee was added to each contract to cover unanticipated engineering fees and construction changes, pushing the total funds needed to build the bridge to slightly over \$600,000. The two contractors were each allotted twelve months to complete their portion of the bridge, meaning that the Glasgow Bridge was slated to open to traffic around January 1, 1925.

Building the Glasgow Bridge

Although the Missouri State Highway Commission approved contracts for construction of the Glasgow Bridge at the end of 1922, the contractors were not allowed to begin work on the bridge until March 1923. Highway department officials refused to release the bridge plans to the contractors until the Bureau of Public Roads gave final approval to the project. Once the federal government accepted the plans, the Union Bridge and Construction Company began to ship material to the site via the Chicago and Alton Railroad. In March 1923 the Union Bridge and Construction Company began building needed support facilities such as a cement factory, train yard, and worker housing. The company also started building a wooden tramway that would be used to move material into position for construction work in the Missouri River. By the end of the month, the company was ready to set the foundation for the first bridge pier.

The primary tool used to set the piers of the Glasgow Bridge was the caisson. Caissons were essentially reinforced wooden boxes that were used to keep the Missouri River away from the excavation site. Once bedrock was reached, the caisson was filled with concrete to form the base of the river pier. H. F. Nelson, a highway department engineer who supervised construction of the Missouri River Bridge at Waverly, Missouri, provided a succinct description of how caissons worked:

Caissons might be compared to an airtight box of steel or wood and turned upside down. These used were made of heavy timber. After being placed in position in the water the concrete forms which were built on top are filled with concrete, except for the shaft which allows the men, called sand hogs, to be lowered into the caisson where they work under air pressure digging out the sand which goes to the top through suction lines. The weight of the concrete sinks the caisson as the sand is excavated and more concrete is added keeping the concrete above the water line until the caisson lands on solid foundation, which in this case is two feet of shale. All the caissons are sunk two feet into shale to prevent any danger

of scowling or slipping from river pressure, ice or drift. The caisson is then filled with concrete through the supply shaft and the foundation is then ready for the pier.

To ensure that the piers of the Glasgow Bridge were set on strong foundations, federal engineers inspected each caisson before it was filled with cement. Working inside a caisson was a dirty and dangerous endeavor for construction workers. Negative air pressure in the caissons occasionally caused workers to suffer from nitrogen poisoning, pain, bleeding, and even death. Fortunately, no workers were killed while setting the piers of the Glasgow Bridge.

When officials with the Union Bridge and Construction Company realized that they were not going to fulfill their contractual obligation to complete the substructure by December 31, 1923, they asked the highway department for an extension. The company presented a list of the reasons for the construction delays to J.A. Williams, the highway department engineer who directly supervised construction of the Glasgow Bridge. Williams sympathized with the plight of the Union Bridge and Construction Company, telling Leif Sverdrup, the engineer in charge of the Missouri State Highway Department's Bridge Division, that the company deserved a three or four month extension to allow them to complete their work. Sverdrup, however, felt little empathy for the Union Bridge and Construction Company. Although Sverdrup acknowledged that the contractor had experienced "considerable difficulties during construction," he refused to grant any contract extension. Instead, Sverdrup simply encouraged the Union Bridge and Construction Company to work as rapidly as possible to finish the substructure, concluding that he saw "no reason why this work should not be completed by about the 15th of March or a little later."

On April 5, 1924, Leif Sverdrup conducted a final inspection of the substructure and declared that the "workmanship on these various units is very good." No liquidated damages were taken from the contract awarded to the Union Bridge and Construction Company as punishment for the delays in completing the substructure, and highway department officials still hoped that the entire bridge might open to traffic by the end of 1924.

By April 1924 the substructure of the Glasgow Bridge had been completed and work on the superstructure could proceed without hindrance. The Mt. Vernon Bridge Company was ready to work on the steel superstructure in the spring of 1924, but the company felt that it needed assistance to pour the concrete deck for the new bridge. Thus, the Mt. Vernon Bridge Company hired an individual contractor, Ernest Vermillion from Higginsville, Missouri, to pour the concrete deck. The two companies worked side-by-side on the Glasgow Bridge, and by the spring of 1925, the bridge was complete and ready to carry traffic.

The Glasgow Bridge opened to traffic in May 1925, and on June 4, 1925, a formal ceremony was held to commemorate the completion of the new structure. Approximately 15,000 people flocked to Glasgow from surrounding communities such as Fayette, Gilliam, Marshall, Slater, and Boonville to participate in the festivities. Visitors to Glasgow were entertained by a parade, performances by community bands, dances, and picnic lunches. The crowd was especially enthralled by an hour-long flyover by three military airplanes from Fort Leavenworth, Kansas. Following a formal ribbon-cutting ceremony at the center of the new bridge speeches were given by a variety of political leaders, including former Glasgow Mayor W.B. Nievert, Senator James Reed, and Theodore Gary, Chairman of the Missouri State Highway Commission. The celebration continued well into the evening with dancing and riverboat excursions along the Missouri River.

The completed Glasgow Bridge measured over 2,200' in length and cost slightly less than \$608,000 to build, and local leaders believed that the new structure would lead to the construction of a major state highway through Glasgow and an economic boom for the surrounding community.

Post-construction History of the Glasgow Bridge

Although local supporters believed that the construction of a bridge across the Missouri River would guarantee the construction of a major state highway through Glasgow, their hopes never came to fruition. The Missouri State Highway Commission instead chose a more southerly route for the major state highway connecting St. Louis and Kansas City. This major highway, labeled U.S. Highway 40, became one of the busiest thoroughfares through Missouri, and it crossed the Missouri River at Boonville rather than Glasgow. Instead of a major cross-state route, a spur highway was built through Saline and Howard Counties to carry traffic to and from the Glasgow Bridge. This highway was originally labeled Missouri State Route 20, and later it was renamed Missouri State Route 240 to reflect its status as a minor spur of U.S. Highway 40. The dream of a major interstate highway crossing through Glasgow at the new bridge never became a reality, and although the bridge proved a boon for local farmers and businessmen, it never provided the economic stimulus hoped for by bridge boosters.

In 1986, the original deck of the Glasgow Bridge was replaced with a concrete-filled grid system, and new guardrails and drainages were installed along the length of the structure. A few years later, a new navigational lighting system was installed along the Glasgow Bridge, the footings of one of the bridge piers were reinforced, and the deck received an asphalt coat. As of the summer of 2007, the Glasgow Bridge remained open to traffic, but it needs to be shut down regularly for repairs. In order to better serve the driving public, the Missouri Department of Transportation is planning to partially reconstruct the Glasgow Bridge beginning in 2008.