Umpqua River Bridge
Spanning Umpqua River on the Oregon Coast Highway
Reedsport
Douglas County
Oregon

HAER OR-45

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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HISTORIC AMERICAN ENGINEERING RECORD

UMPQUA RIVER BRIDGE
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Location:	Spanning Umpqua River on the Oregon Coast Highway, Reedsport, Douglas County, Oregon UTM: Reedsport, Oregon Quad. 10/410400/4840000
Date of Construction:	1934-36
Structural Type:	Reinforced-concrete bridge with central steel swing span
Engineer:	Conde B. McCullough, Oregon State Highway Commission
Builder:	Teufel and Carlson, Seattle, Washington
Owner:	Oregon Department of Transportation
Use:	Vehicular and pedestrian bridge
Significance:	The Umpqua River Bridge is historically significant as one of the five Depression-era PWA bridges that connected the Oregon Coast Highway. The completion of these bridges is considered the dividing line between the period of relative isolation and dependence on sea transportation of Oregon's southern coastal region to its modern era of land transportation and connection with the hinterland. The Umpqua River Bridge is the only one of the five PWA coastal bridges to be constructed with a swing span. It is the longest swing span constructed in Oregon, and one of only a few left in the state. The bridge is also representative of the innovative designs by State Bridge Engineer Conde B. McCullough. McCullough was a pioneer in American concrete bridge design. The Umpqua River Bridge includes early examples of McCullough's use of tied, or bowstring arches, and concrete arches constructed using Considere-type hinges.
Project Information:	Documentation of the Umpqua River Bridge is part of the Oregon Historic Bridge Recording Project, conducted during the summer of 1990 under the co-sponsorship of HABS/HAER and the Oregon Department of Transportation. Researched and written by Gary Link, HAER Historian, 1990. Edited and transmitted by Lola Bennett, HAER Historian, 1992.
Related Documentation:	For more information on Conde B. McCullough, see HAER OR-54.

HISTORY

The Oregon Coast Highway was constructed piecemeal beginning in 1914 in Clatsop County. Sections were constructed north and south from the cross-mountain roads. Limited funds dictated slow progress on these highways. In 1919 the Oregon legislature permitted a bond issue of $2.5 million to complete the road, at that time named the Roosevelt Coast Military Highway. After World War I, the United States military establishment was concerned about defending an inaccessible coastline, and supported this bond measure. The era of long-distance automoblie touring exploded in the 1920's, adding impetus to the completion of the coast highway. The road, and various small bridges, were constructed over a twenty-year period by the different counties, ultimately uniting the disparate highway sections. In 1931 Lewis A. McArthur, an Oregon geographer and historian, suggested that the name of the Roosevelt Coast Highway be changed to the Oregon Coast Highway. In 1932 roughly 400 miles of highway were completed from the Columbia River south to the California border.[1]

In 1932 the highway was yet to be entirely connected. Five channels in the southern half of the state--Coos Bay, Umpqua River, Siuslaw River, Alsea Bay and Yaquina Bay--were crossed by ferries. Soon after the highway was completed, however, travel across these channels dramatically increased and it quickly became apparent that the ferries were inadequate for the traffic. The State Highway Commission called them a "barrier to the growth and development of the Oregon coast region."[2]

Even before completion of the highway it was assumed that these major crossings would eventually be bridged. The state contemplated constructing one bridge each year, and in May 1932 the bridge spanning the Rogue River at Gold Beach was completed. In 1931 chambers of commerce, community clubs and other residents of the central and southerly coastal areas organized the Oregon Coast Highway Association, a regional chamber of commerce. This body pressed the state highway commission to construct another bridge. But the commission had no money for another such undertaking, and felt that it would be no use trying to sell bonds to raise money as the country was in the midst of a major depression.[3]

On June 30 and 31, 1932 the Oregon Coast Highway Association held a meeting at Waldport to discuss plans for pushing construction of more bridges. Ex-Governor Norblad proposed building three bridges as a means to create a market for lumber production in the area. Sam Dolan, an instructor in engineering at Oregon State College, suggested charging tolls on the bridges as a means to help them pay for themselves. This idea was not greeted warmly, and a debate ensued, but it was decided that with popular support tolls may be necessary. The Highway Association also decided to press the state to appeal to the Reconstruction Finance Corporation for funds. The RFC was a Hoover Administration relief program established by Congress in 1932 to help banks, railroads and other major businesses. One year after this meeting the Oregon Coast Highway Association persuaded the State Highway Commission to apply to the RFC for money. Just before approval, however, administrations changed in Washington, D.C. The RFC was cancelled, and an application had to be submitted to the PWA of President Franklin Delano Roosevelt's administration. State Bridge Engineer Conde B. McCullough explained the state bridge section's role at this time:

> When the opportunity of securing federal financing for the structures arose, no planning on any of the bridges except for the Alsea Bay Bridge at Waldport had been done. The force of designers was more than doubled, and a night shift organized. After six months of intensive work, plans and specifications were completed.[4]

Total estimated cost of the project was $5,602,000. The original agreement with the PWA stipulated that the federal government would grant the state $1,402,000, and loan the state $4,200,000 through the sale of bonds. But the state decided then to sell the bonds on the open market, saving on interest rates, and the federal government agreed. Within the state, however, the question of tolls had not been resolved. Tolls were not a popular idea. It was estimated that a carload of five people would pay $4.00 in tolls alone to drive from Coos Bay to Newport and back. Increased highway revenues gave the state new confidence in their ability to pay back the loans, and the 1935 state legislature abolished tolls on the bridges.[5]

Many coastal residents felt that the bridges should be constructed of wood to help out the lumber businesses in the region. The state highway commission considered using wood but decided it would not be practical for the region's climate. The high winds and damp salt air of the coast would cause maintenance costs to run too high, and a few of the spans would be too long for a successful wooden bridge. These structures would necessarily be constructed of steel and concrete, which would last much longer than wood. Besides, state officials argued, the amount of wood required for the wooden falsework for the construction of steel and concrete bridges would be nearly as much as if the bridges themselves were made of wood. Still, lumber interests agitated. At a Highway Commission meeting in Portland they pushed for the use of wood on the coastal bridges. McCullough feared that if their pressure caused delay, the federal money would go elsewhere. In addition, the federal government would not approve the use of wood for the five bridges. Regional residents also feared the loss of federal money, which for them would mean the loss of an anticipated influx of jobs and of local business that construction would bring. Local chambers of commerce voted to support the state in its plan for steel and concrete bridges. The federal government granted final approval of the plans, and in the summer of 1934 contracts were awarded for the construction of five steel and concrete coastal bridges.[6]

One purpose of the coastal bridges project as finalized was to provide jobs for people unemployed by the Great Depression. The project aggregated over 2.1 million man hours directly on the bridges. In addition to this, the project benefitted Oregon industries by consuming 16 million board feet of lumber, 54,000 cubic yards of sand, 110,000 cubic yards of gravel, and 182,000 barrels of cement. It was also expected that future revenue from tourism along the highway would increase greatly, to the benefit of both the state and the region. After construction of the bridges tourism jumped 72 percent in one year.[7]

The bridges also capped twenty-two years of Oregon Coast Highway construction. Concrete was the primary construction material, not only for its durability in the climate but also for its beauty in form. Much attention was given to appearance. The Gothic arch was the primary architectural element. These bridges represent classic examples of the Art Deco style which was a popular design style of the late 1920's and 1930's. The bridges were designed to augment and blend with the natural beauty of their surroundings. State Bridge Engineer McCullough called them "jewel-like clasps in perfect settings, linking units of a beautiful highway."[8]

DESCRIPTION

The Umpqua River Bridge is a reinforced concrete bridge with a central steel swing span which rotates on a central pier. It consists of a steel through Parker truss with a concrete deck. The span is 430' long, and is powered by a 60-horsepower motor. At the ends of the adjacent spans safety barriers are installed that cross the width of the deck. These barriers swing upward, preventing traffic from passing them when the span is open. The operating mechanism of the swing span was designed so that the span cannot move until these barriers have raised. The span is electrically moved by twin controllers--one located in the operating house above the roadway in

the center of the span, and the other along the sidewalk at the roadway level. The original permit for the bridge specifies that the span swing to a 90-degree angle to provide two channel throughways with a horizontal clearance of 195' each. However, at the request of the U.S. Army Corps of Engineers, the builders of the bridge placed fenders at the piers and set the draw rest at an 80-degree skew. The result is that the actual horizontal clearance of the two channels when the bridge is open is 182'. When the span is closed vertical clearance above mean low water is 35'.[9]

The swing span is flanked on both sides by two reinforced concrete through tied (bowstring) arches each 154' in length. The sway braces are reinforced curved concrete members. The portal braces include a decorative emblem in the center of each. The arches are of the bowstring design, which means that the skewbacks are held by I-beam tension members in the bottom chord, rather than by an outside support at each end. The decks are carried on floorbeams supported by the hangers. During construction, the hangers and the bottom chord were not encased in concrete until after the dead load had been applied. This prevented elongation of the hangers and excessive cracking of the concrete incasing them. The arch ribs were constructed with Considere-type hinges. These hinges are points in the rib where the reinforcing steel is not connected and the concrete section not completed until after the dead load is applied to the arch. Then the reinforcing steel is welded together and the concrete poured to full section. The purpose of this method is to eliminate some of the stress in the arch as the dead load is being applied.[10]

The approachs are reinforced concrete deck girder spans. The two on the north end are each 42' long. A total of twenty-three spans make up the south approach. These range from 42' to 70' in length, totaling 1,072'. The piers for these are in two sections, joined at their tops by Gothic arches.[11] The total length of the bridge is 2,206'. The width of the roadway is 27', and the two sidewalks are each 3½' wide each. Decorative features include approach pylons, and railings of precast panels with insets, cut-outs, and decorative pilasters.[12]

CONSTRUCTION

The contract for construction of the bridge was awarded to the firm of Teufel & Carlson of Seattle on July 25, 1934 at $551,234. Resident engineers for the state were D.R. Smith and L.L. Jensen. Work started on July 30, 1934. 215,000 man hours of labor were consumed on direct work on the bridge. An average of 125 men were employed each week, with a weekly payroll of $2,500. The project consumed 10,000 cubic yards of concrete, 740 tons of strucural steel and 650 tons of reinforcing steel. 3,500 cubic yards of excavation was moved and 41,000 feet of piling was driven.[13]

REPAIR AND MAINTENANCE

Most of the maintenance on the Umpqua River Bridge has been routine. In 1937, manholes were installed in the traffic barriers to facilitate maintenance. That same year inspectors noted settling of the south approach, which was reinforced in 1940. In 1941 the bronze expansion plates were removed and repaired, and the transverse beams were reinforced with concrete brackets. In 1951 the catwalk was in need of repairs for damage done by a ship. It seems that on October 15, 1951 a ship struck the catwalk when the captain tried to take it through backwards without the aid of a rudder. The state contemplated bringing suit against the owners, but balked for fear that the case would bring to light the fact that the horizontal clearance of the open span did not meet the specification on the bridge permit. In 1953 the traffic barriers were redecked with steel plates.[14]

ENDNOTES

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2. Oregon State Highway Commission, Twelfth Bienniel Report 1934-35, p.15; Harold B. Say, "Progress Takes Its Toll," The Oregon Motorist, May 1936, p.13.

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4. "History of Coast Bridge Program is Interesting," Coos Bay Harbor (North Bend, Oregon) 28 May 1936, p.1; Miller, "Spanning the Depression," p.12; "Years of Planning for Coast Bridges Bear Fruit in Series of Dedications," Coos Bay Times (Marshfield and North Bend, Oregon) 1 June 1936, p.2.

5. "Siuslaw Span Part of $25,000,000 Road Investment," Register-Guard (Eugene, Oregon), 17 May 1936, p.4.

6. "Lumbermen to Meet to Protest Concrete for 5 Coast Bridges," Sentinel (Cottage Grove, Oregon), 7 July 1933; "North Bend Backs Bridge Engineers," Harbor (North Bend, Oregon), 6 July 1933; "Squabble Over Lumber Ties Up 5 Bridges," Journal (Portland), 9 July 1933; "Want Bridges Built of Wood," Harbor, (North Bend, Oregon), 6 July 1933.

7. "Oregon Bridges Subject of Address Before AAUW," Statesman (Salem, Oregon), 21 Jan 1934; Oregon State Highway Commission, Twelfth Biennial Report, p.59; Arlene Castle, et al., Yaquina Bay, 1778-1978 (Newport: Lincoln County Historical Society, 1979), pp.54-56.

8. "Lovely Settings to Be Provided for New Bridges," Coos Bay Times, 1 June 1936, p.7.

9. Oregon Department of Transportation, Bridge Section Maintenance File #1822, I.A. DeFrance, Assistant Maintenance Engineer, Letter to G.S. Paxson, Bridge Engineer, 7 November 1952; A.O. Chase, "Design of Coast Highway Bridges," Civil Engineering v.6 (October 1936), pp.648-51.

10. Chase, p.649; ODOT, Environmental Section, Bridge File #1822, "Engineering Antiquities Survey," (November 1982), p.87.

11. ODOT, Bridge Section, "Bridge Log," p.16; "Umpqua River Bridge," Oregon Motorist v.8 (May 1936), p.8.

12. "Bridge Log," p.16; Dwight Smith, James Norman and Pieter Dykman, Historic Highway Bridges of Oregon (Portland: Oregon Historical Society Press, 1989), p.120.

13. Oregon State Highway Commission, Twelfth Biennial Report, 1934-1936, p.58.

14. ODOT, Bridge Section Maintenance File #1822, "Bridge History Record of Maintenance," (1934 to 1953); J.A. Weber, Mechanical Engineer, Letter to G.S. Paxson, Bridge Engineer, 15 July 1952.

ADDENDUM TO
UMPQUA RIVER BRIDGE
Spans Umpqua River at
Oregon Coast Highway
Reedsport
Douglas County
Oregon

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