Siuslaw River Bridge
Spanning Siuslaw River on the Oregon Coast Highway
Florence
Lane County
Oregon

HAER OR-58

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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HISTORIC AMERICAN ENGINEERING RECORD

SIUSLAW RIVER BRIDGE
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Location:	Spanning Siuslaw River on the Oregon Coast Highway, Florence, Lane County, Oregon UTM: Florence, Oregon Quad. 10/411200/4868300
Date of Construction:	1934-36
Structural Type:	Reinforced concrete bridge with steel bascule span
Engineer:	Conde B. McCullough, Oregon State Highway Department
Builder:	Mercer-Fraser Company, Eureka, California
Owner:	Oregon Department of Transportation
Use:	Vehicular and pedestrian bridge
Significance:	The Siuslaw River Bridge is historically significant as one of five Depression-era bridges that completed the Oregon Coast Highway. For Oregon's southern coastal region, the completion of these bridges is considered the dividing line between a period of relative isolation and dependence on sea transportation, and its modern era of land transportation and connection with the hinterland. The Siuslaw River Bridge is the only one of the five PWA coastal bridges with a bascule span. The bridge is also representative of the innovative designs by State Bridge Engineer Conde B. McCullough, a pioneer in American concrete bridge design. The Siuslaw River Bridge is an early example of McCullough's use of tied arches and Considere-type hinges.
Project Information:	Documentation of the Siuslaw 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 authorized 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 automobile 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 Military 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. This service was not speedy, but travelers used the time taken in crossing to view the scenery of the Pacific Coast on one side and the Coast Range on the other. The ferries were unique and a bit of a tourist attraction. Passengers appreciated the courtesy, efficiency and effort of the ferry crews in getting them across. However, soon after the highway was completed, 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 Rogue River Bridge at Gold Beach was completed. The Oregon Coast Highway Association, a regional committee formed in 1931 by chambers of commerce, community clubs and other residents of the central and southerly coastal areas, pressed the State Highway Commission to construct another bridge. But the state 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 engineering instructor 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 (RFC) 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 Federal Emergency Administration of Public Works (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 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 this, but decided timber bridges would not be practical for the region's damp 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 timber 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 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 Siuslaw River Bridge is the smallest of the five PWA coastal bridges and connects the towns of Florence and Glenada. It is a 1,568-foot reinforced concrete bridge with a steel double-leaf bascule span at its center. The banks on either side were deemed too low to build a high-level bridge, and the single narrow channel made a bascule draw the most desireable choice of the

moveable types.[9]

The drawspan is a 140-foot long, double-leaf steel deck truss. To open, the two leaves, each hinged on 14-inch trunions, separate in the middle of the span and swing upward and away from each other. This operation is powered by two 15-horsepower motors. As a safety feature, the roadway gates must be closed before the pin locking the two leaves together can be withdrawn. Horizontal clearance through the open span is 110'. When closed, the vertical clearance is 33'. The original deck across the bascule span was Port Orford Cedar wood planking paved with asphalt.[10]

The two main piers are massive concrete structures with large pits at their tops. As the bascule opens, large concrete counterweights descend into these pits. On top of the piers at each of the four corners of the drawspan concrete pier house are located. These contain the control mechanisms. They are 24' long and 9' wide and are topped by ornate roofs with recessed sunburst motifs. The door and window sashes are metal. These metal parts were orginally painted flat grey to match the concrete, but have recently been painted white.[11]

The drawspan is flanked on both sides by two reinforced concrete tied arches, each 154' long. These arches are open spandrel, and have curved sway bracings. The portal bracings bear a decorative winged emblem in their center. Vertical clearance through these arches is 16'-8", and the horizontal clearance is 26'-11". The lower chords, or arch ties, are four eye-bars anchored to the concrete arch by being pinned to I-beams. These I-beams are buried along the axis of the arch, anchored by angle-iron lugs. The arches were constructed with Considere-type hinges. These are points in the rib where the reinforcing steel is not connected and the concrete not poured to full section until after the dead load has been applied to the arch. The purpose of this method is to reduce stress on the entire arch when the dead load is applied. The decks are carried on floorbeams supported by hangers. The hangers and bottom chord bars were not encased in concrete until after the dead load was applied. This was done to prevent elongation and cracking of the concrete in the hangers. The hangers rest on structural steel shoes. The shoes on one end of the arch are on rollers. On the outer side of each of the arch ribs are located concrete spires, the tops of which are similar in design to those of the pier houses.[12]

Approaches to the arch spans total twenty reinforced concrete deck girder spans. There are eight on the north side and twelve on the south side, ranging from 42' to 70' in length. The piers to these are reinforced concrete in two legs, joined at the top, just under the deck, by Gothic arches.[13]

The bridge has 3½-foot wide sidewalks along its entire length on both sides. Both sidewalks are lined on the outside edge by railings consisting of arched balustrades with concrete caps. The entrance to each approach is flanked by two hollow concrete pylons with the same sunburst design as the pier housings and spires.

REPAIR AND MAINTENANCE

For the most part maintenance on the Siuslaw River Bridge has consisted of routine cleaning, painting and minor repairs. The wood plank deck of the draw span was used until the mid-1970s when constant patching made it unserviceable. In 1977 it was replaced by a steel grid deck.[14]

The regulations for the opening of moveable bridges on navigable waters is governed by the United States Coast Guard. These regulations require that an operator be present on any moveable bridge at all times so that any vessel which may want to pass may have the bridge opened at any time. However, from the bridgeowner's standpoint it can be very costly to employ a bridge operator twenty-four hours a day, especially when the bridge is opened infrequently. From the time that the Siuslaw River Bridge was completed, the state opted to disregard

regulations concerning opening the draw. Rather than have a twenty-four hour operator, the state posted a sign in the channel giving navigators instructions and the name and phone number of the representative to call to have the bridge opened. In the early 1970s bridge officials were able to install a radio system where ships at sea could call in for notice that they would need the bridge opened. In 1972 the state applied to the Coast Guard to have the opening regulations amended for the Siuslaw River Bridge. Today the bridge opens on two-hour notice. Openings in the summer months average six to eight per month, in the winter openings are even less frequent.[15]

ENDNOTES

1. Howard M. Corning, ed., Dictionary of Oregon History (Portland: Binford & Mort Publishing, 1989), p.183.

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.

3. Ed W. Miller, "Spanning the Depression," The Oregon Motorist, May 1936, p.12.

4. "History of Coast Bridge Program is Interesting," Coos Bay Harbor (North Bend, Oregon) 28 May 1936, p.1; Ed W. 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, 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. O.A. Chase, "Design of Coast Highway Bridges," Civil Engineering v.6 (October 1936) pp.648 and 651; "Siuslaw River Bridge," Oregon Motorist v.8 (May 1936), p.9; Dwight Smith, et. al., Historic Highway Bridges of Oregon, (Portland: Oregon Historical Society Press, 1989), p.119.

10. Chase, "Design of Coast Highway Bridges," pp.648, 651; "Siuslaw River Bridge," p.9; Oregon Department of Transportation, Bridge Section, "Bridge Log", p.16.

11. Chase, "Design of Coast Highway Bridges," p.9; "Siuslaw River Bridge," p.651; ODOT, Bridge Section, drawing #4789.

12. Chase, "Design of Coast Highway Bridges," p.649; ODOT, Environmental Section, Bridge File #1821E, "Engineering Antiquities Survey," November 1982, p.72; "Bridge Log," p.16.

13. "Bridge Log," p.16.

14. ODOT Bridge Section, Maintenance File #1821E, Maintenance Report, prepared by J. Wood, October 26, 1976.

15. The following are from ODOT, Bridge Section, Maintenance File #1821E: Letter dated 27 Feb 1940, W.W. Stiffler, Asst. Maintenance Engineer to K.D. Lytle, Division Engineer; Letter dated 2 June 1972, A.E. Johnson, Asst. State Highway Engineer to Commander, U.S. Coast Guard, 13th District.

ADDENDUM TO
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