1. SITE I.D. NO

HAER INVENTORY

Historic American Engineering Record
Department of the Interior, Washington, D.C.

2. INDUSTRIAL CLASSIFICATION: Bridges, Trestles and Aqueducts

3. PRIORITY: 1

4. DANGER OF DEMOLITION? (SPECIFY THREAT) ☐ YES ☐ NO ☒ UNKNOWN

TRUSS: steel | 7603

5. DATE: 1911

6. GOVT SOURCE OF THREAT: OWNER ADMIN

7. OWNER/ADMIN: Chicago, Milwaukee, and St. Paul and Pacific Railroad Company

8. NAME(S) OF STRUCTURE: Idaho and Washington Northern Railroad Bridge

9. OWNER'S ADDRESS: 516 West Jackson Boulevard
Chicago, Illinois 60606

10. STATE COUNTY: WA 051 | COUNTY NAME: Pend Oreille | CITY/VICINITY: Metaline Falls | CONG. DIST.: 05

STATE COUNTY | COUNTY NAME | CITY/VICINITY | CONG. DIST.

11. SITE ADDRESS (STREET & NO.)
Crossing: Pend Oreille River
S.T.R. 13 38N 43E off of route 31

12. EXISTING SURVEYS ☐ NR ☐ NHL ☐ HABS ☐ HAER—I ☐ HAER ☐ NPS ☐ CL6
☐ CONF ☐ STATE ☐ COUNTY ☐ LOCAL ☐ OTHER

13. SPECIAL FEATURES (DESCRIBE BELOW)
☐ INTERIOR INTACT ☐ EXTERIOR INTACT ☐ ENVIRONS INTACT

14. UTM ZONE 11 | EASTING 469950 | NORTHING 5402920 | SIGN
SCALE ☒ 1:24 ☐ 1:62.5 ☐ OTHER ____ QUAD NAME: Metaline, Washington

UTM ZONE | EASTING | NORTHING | SIGN
SCALE ☐ 1:24 ☐ 1:62.5 ☐ OTHER ____ QUAD NAME

15. CONDITION: 70 ☐ EXCELLENT 71 ☐ GOOD 72 ☐ FAIR 73 ☐ DETERIORATED 74 ☐ RUINS 75 ☐ UNEXPOSED 76 ☐ ALTERED 82 ☐ DESTROYED 85 ☐ DEMOLISHED

16. INVENTORIED BY: Lisa Soderberg | AFFILIATION: HAER/Washington State Bridge Inventory | DATE: October 1979

17. DESCRIPTION AND BACKGROUND HISTORY, INCLUDING CONSTRUCTION DATE(S), HISTORICAL DATE(S), PHYSICAL DIMENSIONS, MATERIALS, EXTANT EQUIPMENT, AND IMPORTANT BUILDERS, ENGINEERS, ETC.

In 1911, the Idaho and Washington Northern Railroad erected a two span riveted deck truss across the Pend Oreille River just south of Metaline. The bridge was an important connecting link in the railroad's 9.5 mile line between Ione and Metaline Falls which was completed in the same year. The single track grade, supported by one 145 foot shore span, and one 280 foot channel span, rises 140 feet above the fast moving river. The bottom chord of the shore arm conforms to the steep contours of the land. The span over the channel is a Pratt truss with horizontal bars intersecting the 2nd, 4th, 5th and 7th panels.

The significance of the bridge lies in the method that was used to erect the steel structure in the rugged, inaccessible terrain. An article in a January 1911 issue of Engineering News reported that the bridge was "constructed under rather exceptional conditions, which led to a novel solution." Because of the location of the crossing, which

(CONT OVER)

18. ORIGINAL USE: railroad | PRESENT USE: railroad | ADAPTIVE USE:

19. REFERENCES—HISTORICAL REFERENCES, PERSONAL CONTACTS, AND/OR OTHER

"An Unusual Case of Bridge Erection by the Cantilever Method," Engineering News, Vol. 64, No. 2 (1911 January), p. 46.
Cheever, Bruce Bissell, The Development of Railroads in the State of Washington, Bellingham: Western Washington College of Education, 1949.
Derluth, August, The Milwaukee Road, New York: Creative Age Press, 1948.

(CONT OVER)

20. URBAN AREA 50,000 POP. OR MORE? ☐ YES ☒ NO

21. HCRS REGION: NW

22. PUBLIC ACCESSIBILITY ☒ YES, LIMITED ☐ YES, UNLIMITED ☐ NO ☐ UNKNOWN

23. EDITOR INDEXER

24. LOCATED IN AN HISTORIC DISTRICT? ☐ YES ☒ NO NAME DISTRICT I.D. NO

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Description (continued)
traverses water that reaches depths of up to 200 feet, with a swiftly moving current, it was not feasible to build falsework. Consequently, the erectors, McCreary and Willard of Spokane, Washington resorted to the cantilever method of construction. The conditions of building the Metaline Falls Bridge were identical to conditions for cantilever construction, outlined by the prominent bridge engineer, J.A.L. Waddell in his book on bridge engineering published in 1916. "The conditions which generally call for cantilever construction are deep gorges to be crossed by single spans, and the impracticability of using falsework because of danger from washout." Although cantilever construction had been used for long span trusses throughout the fourth quarter of the 19th century, Waddell was extremely cautious about the wide use of this method of construction. "Cantilever bridges are a type of structure eminently suitable for certain conditions, but they should never be adopted unless those conditions exist, because they are inferior in rigidity to simple truss bridges and usually require more metal for their construction."

In this particular instance the construction of the Metaline Falls truss was further complicated by the fact that only one bank was readily accessible. Under normal circumstances, a bridge erected by the cantilever method is constructed from both sides of the bank, and converges in the middle of the river, "so that the maximum projection (will) be about half the length of the span." However, in order to erect the railroad bridge in this way, it would have been necessary to transport the materials to the other side of the river by building an expensive "cableway plant." In light of these factors, the engineers decided to erect the bridge from one bank. The shore span which weighs about 300 tons, was designed to serve as an anchor arm during the construction of the channel crossing. In addition, the shore arm was loaded with 600 tons of steel rails as counterweight for the 700-ton channel span. The shore span and channel span share a common shoe for the purpose of transmitting the bottom chord compression of the channel span to the shore span during erection. During construction, the top chords were joined by tie-bars which were removed when the channel span was finally brought to bearing on the opposite abutment.

The steel, fabricated by the Pennsylvania Steel Company of Steelton, Pennsylvania was set by a derrick car which travelled along the top chord. The bridge was owned by the Idaho and Washington Northern Railway until 1916 when the railway company was sold to the expanding empire of the Chicago, Milwaukee, and St. Paul Railroad.

REFERENCES (CONTINUED)

ABSTRACT

HAER NO | LC | TECH REPORT | HIST REPORT | CONTEMP PHOTO | HIST PHOTO | CONTEMP DRWG | HIST DRWG | COLOR PLATE | PHOTOGRAM | SW | FILM

GPO 937 842

25. Photos and Sketch Map of Location