ALASKA RAILROAD, BRIDGE AT MP 305.7 (MIDDLE FORK OF CHULITNA RIVER)
Spanning Middle Fork of Chulitna River, about 1.5 miles north of Broad Pass
Broad Pass (historical) vicinity
Matanuska-Susitna Borough
Alaska

WRITTEN HISTORICAL AND DESCRIPTIVE DATA
FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
ALASKA REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
240 West 5th Avenue, Room 114
Anchorage, AK 99501
Location: Spanning Middle Fork of Chulitna River, about 1.4 miles north of Broad Pass, Broad Pass (historical) vicinity, Matanuska-Susitna Borough, Alaska

UTM: 387,158 E; 7,015,654 N; Zone 6

Present Use: The bridge is currently used by the Alaska Railroad for its original function, allowing trains to cross over the Middle Fork of the Chulitna River.

Significance: The surplus military I-beam bridge at MP 305.7 was erected in 1951 as a component of the post-war rehabilitation effort by the Alaska Railroad to upgrade the bridges and track structure to meet the increased demand of heavier equipment and increased military use anticipated during the Cold War.

The bridge is the longest span of surplus military I-beams on the railroad. The period of significance of the bridge is 1947-52. It was determined eligible for listing in the National Register under Criterion C as a typical example of a military surplus I-beam bridge associated with the rehabilitation of the railroad during the early Cold War era.

Part I. Historical Information

A. Physical History:

1. Date of Construction: The bridge was constructed by the Alaska Railroad in 1951 as a 385'-long, eleven span ballasted structure comprised of surplus military I-beams with concrete piers and abutments.

2. Architect/Engineer: The 1951 plans of concrete piers, abutments and the overall bridge structure were prepared by engineer Holmen of the Office of the Chief Engineer of the Alaska Railroad.

A 1971 renovation plan to stiffen the surplus military I-beams was prepared by engineer Robert D. Hutton of Modjeski & Masters of Harrisburg, Pennsylvania, for the Alaska Railroad.

3. Original and Subsequent Owners: Alaska Railroad Corporation

4. Builder, Contractor, Suppliers: From a review of 1951 plans and files of the Alaska Railroad Corporation, the following has been ascertained.
The Alaska Railroad supplied: ballast and track; eleven 35' spans of six surplus I-beams per span; used rails for built-up piles; sole plates, masonry plates, steel for expansion at piers, steel for expansion at abutments, and plates for tops of built-up piles. The contractor supplied: concrete, reinforcing steel, lumber, creosoted hardwood shims, and hardware. The West Coast Wood Preserving Company of Seattle, Washington, provided the creosoted hardwood shims for M. P. Butler, contractor, who was presumably the general contractor for the 1951 military surplus bridge.

5. Original Plans and Construction: The Office of the Chief Engineer of the Alaska Railroad prepared the plans for this bridge to accommodate military surplus I-beams that were contributed by the U.S. government to the railroad at no cost. The 1951 plans of the present bridge consist of three sheets, dated January 1951, that are in the plan files of the Alaska Railroad Corporation and are included in field notes accompanying this documentation. These plans include a plan, elevation, schedules and quantities of materials along with sections and details at abutments and piers to accommodate typical 35' military surplus I-beams. A set of three I-beams with diaphragms is located under each rail. A spacer unit along the center line of the bridge connected the two sets of I-beams.

6. Alterations and Additions: This military surplus I-beam structure was strengthened in the summer of 1972 in accordance with a plan prepared by Modjeski & Masters in August 1971. The strengthening plan provided for the removal of steel fasteners and spacers between the two sets of I-beams and their replacement with new bracing angles and additional spacer units welded together and attached to the inner I-beams of each set with high-strength bolts. Between 1978 and 2003, additional concrete bases were poured around nine of the concrete piers.

B. Historical Context:
In 1912, President Taft convinced Congress to appoint a commission to investigate Alaska’s transportation problems, and the Alaska Railway Commission was formed. Members visited various locations in the state and prepared a report recommending construction of a “Government Railroad” from Kern Creek through the Matanuska coal fields to the Kuskokwim Valley (Fitch 1968: 2). A previous survey undertaken by the Alaska Central Railroad in the winter of 1905-1906 had determined that a route through Broad Pass was feasible for a railroad through the Alaska Range (Mears 2002: 65). This is the location of the bridge which is being documented.

Construction crews pushed the line, north towards Fairbanks and south to meet the line from Seward, in part by using equipment and track left over from building the Panama Canal. Finally on July 15, 1923, a golden spike driven by President Warren G. Harding signified completion of the line known to many as the “Government Railroad” (Mears 2002: 223-226).

Despite high expectations, the economy in the Territory of Alaska did not surge with completion of the long-awaited railroad; instead, it stagnated between the two world wars, with declining population and little development. World War II helped to temporarily revive the railroad, since
it was an important resource that saw extensive military use throughout the war. The tonnage transported tripled between 1938 and 1945 and the wear-and-tear on the railroad infrastructure was considerable while little maintenance and construction was undertaken during this critical military effort (Fitch 1967: 51).

Between the official completion of the line in 1923 and 1947, only minor improvements and repairs were made on the roadbed and drainage structures. The original 70-pound rail was laid on untreated crossties, with little ballast, over a sub foundation of tundra, and had become so warped and battered by the extra traffic of the war years that a thorough rehabilitation of the entire line, plus many improvements, was deemed a prime necessity in order to continue operations and to meet the growing needs of the defense programs (Anderson 1964: 11).

As a result of World War II, the Federal government became aware of the strategic value of Alaska. The government also realized that a railroad in disrepair was more of a liability than an asset. As one Army general noted, “we consider the rapid accomplishment of the rehabilitation program and re-equipping of the Alaska Railroad as essential to the progress of the military development program and as primary requisites for the security of Alaska” (Fitch 1967: 93).

Surplus military I-beams were made available at no cost to the Alaska Railroad. A railroad memorandum from the Assistant Chief Engineer states:

> The steel had already been purchased and paid for by the government. It was made available to the Railroad without cost. It was “…adequate for the loading and light density of traffic being handled at the time, and in the foreseeable future.” New steel was scarce and not obtained without priority (ARR 1968 Memorandum).

These steel bridge components were certainly cheaper, and perhaps more importantly, were readily available so that the bridge replacement could proceed without waiting for scarce materials. They could be erected quickly “by the book” using standard parts and drawings, and had adequate capacity to haul supplies for the rehabilitation program.

The postwar rehabilitation of the Alaska Railroad began in 1948 when, in recognition of the threat posed by the Soviet Union, Congress appropriated $4 million in cash and authorized $15 million in contracts. By the time the rehabilitation was essentially completed in 1952, diesels had replaced steam locomotives, 115-pound rails had been substituted for 70-pound rails on a newly realigned and ballasted roadbed, and creosoted timbers were installed in the place of prewar untreated bridge piles. The Alaska Railroad also replaced many timber trestles and some other older bridges with military surplus steel bridges (ARRC Historic Bridge Survey: Context).

The replacement of the original 1,008' timber trestle at MP 305.7 with a 385', eleven span, ballasted structure of surplus military I-beams in 1951 is a typical example of this postwar rehabilitation effort to upgrade the rail line in preparation for the Cold War. The former long timber trestle had obviously suffered from heavy traffic and lack of maintenance during the 1923-1947 period when only minor repairs and maintenance were performed on the overall line.
The shortening of the length of the bridge by filling the approaches and constructing a new bridge over the riverbed was appropriate to an upgrade of the rail line at this location.

The available surplus military I-beams from World War II that had been given by the military to the federally-owned Alaska Railroad were an obvious choice for this new bridge. Utilizing the War Department 1944 Technical Manual TM5-371, the railroad’s Office of the Chief Engineer designed a new 385’ bridge of concrete piers and abutments to support eleven spans of surplus military I-beams with a ballasted deck. The new bridge was constructed beside the former timber trestle that was removed after the new bridge was placed in service.

The bridge is significant for its use of readily available military surplus steel beams used for railroad use in World War II and concrete piers and abutments of a design typical of the period to construct the longest spans of I-beams on the railroad. It was an integral component of the post-war rehabilitation of the line with a design and materials appropriate to this period of significant upgrades to the railroad to accommodate the heavier rail loads and traffic that were foreseen during the long Cold War era.

**Part II. Architectural Information**

**A. General:**

1. **Architectural Character:** The current bridge is an eleven span, 385’-long ballasted deck structure comprised of 35’ surplus military I-beams that run north-south, carrying a single railroad track over the Middle Fork of the Chulitna River. Each rail of the track is supported by a set of three I-beams for a total of six I-beams per span. The spans are supported by ten concrete piers and two concrete abutments.

2. **Condition of Fabric:** The concrete piers and abutments, the steel superstructure, and the deck and track are all in poor condition.

**B. Site:**

The bridge is located in the Broad Pass of the Alaska Range and is adjacent to Denali National Park and Preserve. It is 1.4 miles north of the early station stop of Broad Pass, which was a pivotal location for the original railroad layout to get through the Alaska Range and to establish a feasible railroad connection between Anchorage and Fairbanks. Broad Pass is the highest elevation of the Alaska Railroad, over 2,000 feet above sea level. The scenic beauty of Broad Pass with Mt. McKinley and hundreds of other peaks of the Alaska Range is one of the most scenic areas of the Canadian Rockies. The bridge is visible from Parks Highway which passes the bridge on the west. The immediate area around the bridge is heavily laden with extensive alluvial rock deposits, small trees and brush. It is a scenic location popular with fishermen. The grade of the track is level to plateaus on both sides of the Chulitna River and curves toward the northeast on the north end of the bridge.
C. Architectural Description:

1. Dimensions: The bridge is 385' long, 14' wide, and approximately 20' high above the riverbed. Each 35' span contains a set of three W24 x 84 I-beams under each rail for a total of six beams per span, as specified in the U.S. War Department Technical Manual TM5-371 “I-Beam Railway Bridge.”

2. Description: This single track ballasted bridge is comprised of eleven, 35' spans of military surplus steel I-beams that rest on ten reinforced-concrete piers and two reinforced-concrete abutments. Piers are either 8' or 9' in height with a 16" high simple concrete cap that extends 2" beyond the piers. Both ends of the piers and caps are partially splayed at an angle of approximately 45 degrees.

Used 70-pound rails were provided by the railroad to the contractor to construct the piles to support the superstructure. Three rails were welded into a Y shape to comprise each pile. River-based erosion of a pier at the south end of the bridge has exposed piles, as seen in the photographs in the appendix to this report.

The eleven spans are comprised of 35'-long military surplus W24 x 84 I-beams. Each span contains six I-beams arranged in two sets of three beams centered under each rail and stabilized with diaphragms. The two sets are connected by steel spacers.

In 1970, the Alaska Railroad engaged Modjeski & Masters to develop plans to structurally upgrade and strengthen the bridge by replacing the original bracing angles with new bracing angles and additional spacer units, welded together and attached to the inner beams with high-strength bolts. This work was carried out in 1971.

Part III: Sources of Information

A. Original Architectural Drawings: The following plans for the Chulitna River Bridge at MP 305.7 are located in the plan files of the Alaska Railroad Corporation in Anchorage, Alaska. Copies are in the field records accompanying this documentation.

1951 Bridge No. 305.7—Middle Fork of Chulitna River by engineer Holmen of the Office of the Chief Engineer, Alaska Railroad
   Sheet 2 of 3: Details of Abutments and Piers, dated January 1951.
   Sheet 3 of 3: Sections and Details, dated January 1951.

1971 Renovation Strengthening of Bridge No. 305.7
B. Early Views: The following photographs are located in the photographic files of the Alaska Railroad Corporation in Anchorage, Alaska. Copies are in the field records accompanying this documentation.

1951 Construction view of concrete abutment and piers looking north.

1969 Oblique view of piers and deck looking northeast.

1969 View of track and deck looking north.

C. Bibliography/References Cited:

Alaska Engineering Commission

*General Specifications for Piling for Trestle Bridges*, approved May 25, 1915.

Alaska Railroad


Anonymous


Brown, C. Michael and Michael S. Kennedy


Crittenden, Katharine Carson


Fitch, Edwin M.


Hanable, William S.


U.S. War Department

D. Likely Sources Not Yet Investigated: None known.

Part IV. Project Information:
The Alaska Railroad Corporation proposes to replace the existing 385' military surplus I-beam bridge with a new steel or concrete bridge with a concrete composite deck. The new bridge will be constructed adjacent to the existing structure, which will be removed after the new bridge is placed in service. The bridge is presently in poor condition and is subject to severe speed restrictions for all rail traffic. The purpose of this project is to increase the bridge carrying capacity, improve safety, and decrease maintenance costs. The project will adversely impact the existing bridge, which has been determined eligible for the National Register of Historic Places.

The project historian was Paul J. McGinley, Principal, McGinley Kalsow & Assoc., Architects & Preservation Planners. The photographer was Larry Mishkar.

Figure 1: View north of deck, walkway, rail line and surrounding terrain.

Figure 2: Oblique view northeast of abutments and west side of deck (note exposed piles at base of the concrete pier at edge of the river bed).
Figure 3: Detail of concrete pier and exposed piles at base.
Figure 4: Oblique view east of west side of deck and concrete piers at north end of bridge.

Figure 5: Upward view of bottom three I-beams centered under each rail with 1971 cross bracing and stiffener plates connected to each set of I-beams with high-strength bolts.