HISTORIC STRUCTURES REPORT

RAILROAD TRESTLES

GOLDEN SPIKE N.H.S.

ON MICROFILM

JUNE, 1971
Historic structures report, railroad trestles, Golden
HISTORIC STRUCTURES REPORT

RAILROAD TRESTLES

GOLDEN SPIKE NATIONAL HISTORIC SITE
PROMONTORY, UTAH

APPROVAL SHEET

Recommended

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Chief, Office of History and Historic Architecture, WSC

6/29/71

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Director, Western Service Center

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7/5/71

Concurred in

Sgd Jerry Allen Connolly
Chief, Office of Archeology and Historic Preservation, WASO

7/18/71

Approved

Sgd Frank Kawski
Director, Southwest Region

9/8/71
HISTORIC STRUCTURES REPORT

RAILROAD TRESTLES

GOLDEN SPIKE NATIONAL HISTORIC SITE
PROMONTORY, UTAH

Prepared by
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WESTERN SERVICE CENTER
OFFICE OF HISTORY AND HISTORIC ARCHITECTURE
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR
SAN FRANCISCO, CALIFORNIA

JUNE 1971
TABLE OF CONTENTS:

III ADMINISTRATIVE DATA 1
A. Name and Number of Structures
B. Proposed Use of Structures
C. Justification for Such Use
D. Provisions for Operating the Structures
E. Proposed Construction Activity
F. Preliminary Estimate and P. C. P.

IV HISTORICAL DATA 4
A. Background
B. Structural History
C. Recommendations
D. Drawings of Historic Conditions

V ARCHITECTURAL DATA 9
A. Architectural Description
B. Existing Conditions
C. Proposed Construction Activity
D. Photographs of Existing Conditions
E. Record Drawings of Existing Conditions
III ADMINISTRATIVE DATA

A. Name and Number of Structures:

These structures are referred to herein as Trestle No. 1 and Trestle No. 2 as designated on the accompanying Historic Base Maps, in lieu of any official designation.

B. Proposed Use of Structures:

These trestles are proposed for use as interpretive structures relating to the construction of the first Transcontinental Railroad.

C. Justification for Such Use:

The National Survey of Historic Sites and Buildings' Special Report on Promontory Summit, Utah, (Golden Spike National Historic Site) by Robert M. Utley, Historian, February 1960, recommended inclusion within the Site boundaries those "historic remains that illustrate the construction story," of which these trestles are a part, on the basis that "all, or nearly all, are necessary to proper interpretation." The fact that the boundaries were so fixed as to include these structures substantiates their interpretive value even though research for this report discloses that these trestles do not relate directly to the original construction of the transcontinental railroad in 1869, (See Historical Data, page 7.)
D. Provisions for Operating the Structures:

The National Park Service will continue to maintain these trestles as historic exhibits in place within the boundaries of the Golden Spike National Historic Site.

The exhibits will be unmanned and interpretation will be by appropriate signs at the site.

Obstructions shall be so placed to prevent vehicular traffic over the structures; and foot traffic should be with caution due to hazards of open trestles without railings.

Supervision will be by occasional visits by Park personnel.

E. Proposed Construction Activity:

1. Stabilize foundation construction and piles, replacing unsound members with like members.

2. Restore wash drainage bed to original grades.

3. Replace unsound members of superstructure with like members and with like connections.

4. Treat all lumber with preservative. New material shall be treated before placing.

5. Clear site of extraneous vegetation.
F. Preliminary Estimates and P. C. P.

TRESTLE NO. 1:

Earthwork (excavations, grading, backfill) . . . $1,100
Foundations (Provide concrete footings under missing and deteriorating wood piers) . . . 500
Carpentry (repair and replace missing and/or deteriorating structural members) . . . 7,400
Miscellaneous Metals (connectors, spikes, drift pins, etc.) . . . . . . 250
Preservation Treatment . . . . . . . . . . . . 250
Miscellaneous Repairs . . . . . . . . . . . . 500

TOTAL $10,000

TRESTLE NO. 2:

Earthwork (provide and place fill to restore original grade of wash bed, footing excavations, etc.) . . . . . . . . . . . . $6,750
Foundations (provide concrete footings for piles no longer bearing on solid earth) . . . . . . . . 1,000
Miscellaneous repairs . . . . . . . . . . . . 250

TOTAL $8,000

NET CONSTRUCTION COST TRESTLES NO. 1 AND NO. 2 $18,000

Plans and Surveys @ 14% . . . . . . . . . . . . $2,520
Supervision @ 11% . . . . . . . . . . . . . . . . 1,980
Contingencies @ 14% . . . . . . . . . . . . . . . 2,520

GROSS PROJECT COST $25,020
PROJECT CONSTRUCTION PROPOSAL

MENT OF MANAGEMENT'S REQUIREMENTS, PROPOSED WORK, AND ITS RELATIONSHIP TO OTHER FACETS OF THE PARK

Place foundations under pilings, improve bed of drainage under trestles, replace missing structural elements, weatherproof and otherwise stabilize these historic structures. One trestle is in advanced stage of deterioration and will require considerable stabilization work and rehabilitation and weatherproof treatment.

The above work should be accomplished in a manner which will retain or recreate the original appearance of the structure. The old deteriorated structure should be restored to the original but should be stabilized in its present appearance with only necessary structural elements replaced to assure its retention.

ICE REQUIREMENTS DATA

MASTER PLAN NO. NHS GS 3000 A

INTERRELATİED & DEPENDENT PROJECT PCP NUMBERS A

ETIVE PROSPECTUS APPROVAL DATA

proved November 21, 1967

IGHT NEEDS & STATUS

A

H NEEDS & STATUS

A

AMENDED BY SUPERINTENDENT (Signature & Date)

William T. Krueger 10/17/69

4. APPROVED BY REGIONAL DIRECTOR (Signature & Date)

CARL O. WALKER Acting Regional Director JAN 8 1970

6. BLDG. OR RT.# AND SEC.

1st Central Pacific R.R. Grade

5. PARK

Golden Spike National Historic Site

7. ACT

Stabilization and Rehabilitation

Historic Trestles (2)

Box Elder (County)

Utah (State)

10. PCP INDEX NO.

N-14-1
## Day Labor Contract

### PCP Index No. M-14-1

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<th>Quantity</th>
<th>Cost</th>
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<td>L.S.</td>
<td>$10,000</td>
</tr>
<tr>
<td>Lize &amp; restore Trestle No. 2</td>
<td>L.S.</td>
<td>$8,000</td>
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Estimate prepared from management requirements updated by Historic Structures Division, WSC. and Contingencies are from new percentage tables. G.D.S.

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**Estimate Totals**

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<tr>
<td><strong>(1) TOTAL</strong></td>
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IV HISTORICAL DATA

A. Background:

As the construction of the Transcontinental Railroad neared completion, both the Central Pacific and the Union Pacific Railroads engaged themselves in a fierce competition to extend their lines as far as possible. Both were eager to tap the lucrative business potential of the Great Salt Lake Valley, the railhead for which was to be Ogden, Utah. An 1864 Amendment to the original Pacific Railroad Act of 1862 permitted the issuance of two-thirds of the Government bonds due on any twenty mile section upon completion of the grading without its having to be directly connected to other sections or the already completed portions of the line.1 It also doubled the original land grants from five to ten sections per mile.2 In 1866, Congress passed another amendment allowing the railroad companies "when the nature of the work to be done, by reason of deep cuts and tunnels, shall for

the expeditious construction of the railroad require it, to work for an extent of not to exceed three hundred miles in advance of their continuous completed line.\(^3\) The direct financial benefits to be derived from the additional land grants and government funds thus made available provided further inducement for such competition. The result was that for about two hundred miles, both in the Wasatch Mountains east of Ogden and over the Promontory Summit, parallel roadbeds were constructed by both companies. On April 9, 1869 an agreement was reached and approved by Congress on April 10, providing that:

The common terminus of the Union Pacific and the Central Pacific railroads shall be at or near Ogden; and the Union Pacific Railroad Company shall build, and the Central Pacific Railroad Company shall pay for and own, the railroad from the terminus aforesaid to Promontory Summit, at which the rails shall meet and connect and form one continuous line.\(^4\)

The two trestles with which we are herewith concerned lie on the Central Pacific Grade on the eastern slope of the Promontory Range. As a result of the above agreement, the original tracks

\(^{3}\) Public Acts of the 39th Congress of the United States (Session I, 1866) chapter 159, section 2.

were laid on the paralleling Union Pacific grade. Thus, these
two trestles are not on the original line, and it was not until
1870 that the tracks were moved to the Central Pacific grade in
this location.5

B. Structural History:

The Chief Engineer for the Central Pacific Railroad at the
time this grade was constructed was Samuel S. Montague, who had
succeeded Theodore D. Judah in the position upon the latter's
death. Montague put Assistant Chief Engineer Lewis M. Clement
in charge of the Promontory operations.6 The grading contract
for the Central Pacific line between Ogden and Promontory was
given to the Mormon firm of Benson, Farr and West, who were to
prepare the line under the direction of Central Pacific engineers.7
Thus it is probable that at least the original trestles were con-
structed by this firm under Clement's supervision.

5. F. A. Ketterson, Jr., Historical Base Map, 1869, Golden
Spike National Historic Site (September 10, 1969) p. 17.
6. Utley, p. 44.
7. Ibid.
In 1904, the Lucin Cut-off across Salt Lake eliminated this section of track from the main line of what was now the Southern Pacific Railroad. It was thereafter used primarily by maintenance trains for the transcontinental telegraph, which still followed the original route. It was abandoned and the track torn up for scrap in 1941.

Trestle No. 1, the easternmost and smaller of the two trestles, was heretofore thought to date to 1869. While most of the records of the Central Pacific Railroad were destroyed in the San Francisco earthquake and fire of 1906, Southern Pacific records pertaining to the maintenance and use of that section of the line during the latter years of its use indicate that Trestle No. 1 (S. P. Structure 779.91) was constructed in 1889 and Trestle No. 2 (S. P. Structure 779.89) was constructed in 1938. Trestle No. 2 was intended to replace Trestle No. 1, but Trestle No. 1 was never removed, probably due to the subsequent abandonment of that portion of the line shortly thereafter.


9. This information was supplied by the Chief Engineer for the Southern Pacific Railroad through the kind efforts of Mr. George Kraus of the Public Relations Office, Southern Pacific Railroad, April 9, 1971.
C. Recommendations:

While neither trestle now appears to date to 1869, they are still worth preserving for their interpretive value. Both are interesting examples of typical railroad construction. Trestle No. 1, while not part of the original line, nevertheless dates to the Central Pacific period, and is a historic structure in its own right, since it is over 80 years old. Recommended preservation activities will be outlined in the Architectural Data Section.

More factual information regarding the trestle construction employed on the original line could be provided by a conjectural reconstruction of the burned-out trestle on the Central Pacific Grade (Trestle No. 3) and by reconstructing the "Big Trestle" on the Union Pacific Grade (Trestle No. 4), of which several photographs of sufficient detail are still in existence (see Plate 1). In the meantime, stabilization and reconstruction of the structures already in existence will serve admirably.

D. Drawings of Historic Conditions:

See Appendix B, Figures 1 and 2.
V. ARCHITECTURAL DATA

A. Architectural Description:

Trestle No. 1 is a single-span trestle of framed timber construction. Timber bulkheads of winged construction are held in place by a 4-post bent supported by timber piers at the western abutment, and by a 5-post bent supported by a timber mud-sill at the eastern abutment. The bents are braced by two upper braces spanning between the caps of the bents and one lower brace at grade between the sill of the west bent and the uphill post of the east bent. The deck is of open construction with guard timbers at the ends of the ties, and is supported by four girders under each rail.

Trestle No. 2 is a three-span pile trestle. Each bent is made up of five piles in battered configuration. The timber bulkheads are of straight construction. The deck again is of open construction, also with guard timbers at the ends of the ties and also supported by four girders under each rail.

B. Existing Conditions:

Virtually all of the timbers in Trestle No. 1 are badly deteriorated. Two of the timbers piers at the west bent are missing, and the bent now hangs somewhat precariously from the remaining two, held in place primarily by the weight of the structure.
Severe erosion of the bed of the wash, which now lies four to five feet below its original grade, has exposed much of the foundation structure. The girders are badly rotted at both ends. The sway-braces are missing from both bents. The ties are rotted and/or missing, and the guard timbers rotted and broken. Erosion has exposed and destroyed portions of the bulkheads. In general, this structure is in poor condition.

By comparison, trestle No. 2 is in sound shape, its only major deficiency being that the bed of the wash has eroded to a point below the bottom of the piles in some areas, affording them no bearing. The condition of the timbers throughout seems to be good, primarily due to the preservative treatment the timbers have received.

C. Proposed Construction Activity:

The problem of erosion has already been effectively controlled by diverting the surface runoff so as to bypass both trestles.

At trestle No. 1, the exposure of the foundations caused by previous erosion provides interesting interpretive possibilities with regard to trestle construction, and there would not seem to be undue structural problems in allowing the grade to remain
where it is. At present, however, the trestle is not sound. Stabilization could be achieved by replacing the missing structural members and those so far deteriorated as to be a safety hazard, and by some reconstruction of the bulkheads to prevent deterioration of the roadbed. The remaining original members, as well as replacement members, should be treated with preservative to forestall excessive future deterioration. An ongoing program of maintenance and occasional replacement of deteriorating members would have to be instituted. This treatment would preserve much of the structure's present appearance and aged character.

A suggestion has been made that these structures be made sound enough to carry automobile traffic. To make such a provision, it would be necessary to replace virtually the entire structure of trestle No. 1, and to make some rather drastic alterations to its visual appearance. On the other hand, its present deteriorated appearance is generally in keeping with the character of other items of interest within the park, which is generally that of ruins and remains. This appearance can be preserved even though the structure be stabilized and several members replaced. It is recommended, therefore, that no alterations or provisions for
automobile traffic be made until and unless master plan and interpretive studies indicate that such alterations would be desirable.

Trestle No. 2 will require concrete foundations to be placed under those piles now exposed by erosion. This will be necessary to provide adequate solid bearing. The bed of the wash should be restored to approximately its original grade in the case of this second trestle, in order to conceal these concrete foundations, and because it is not possible to illustrate the structural principle of piles by exposing them. Members showing excessive deterioration should be replaced.

D. Photographs of Existing Conditions:

See Appendix A, plates 2 to 25.

E. Record Drawings of Existing Conditions:

See Appendix B, figures 3, 4 and 5.

VI ARCHEOLOGICAL DATA

No archeological investigation within the immediate area of the structures is currently anticipated.
VII LANDSCAPE DATA

No landscape treatment within the immediate area of the structures is currently anticipated. Any future treatment of this nature should reflect the historic nature of the site and the basic intent to preserve the historic scene. However, extraneous vegetation in the proximity of the trestles should be removed.

VIII FURNISHINGS AND EXHIBITION DATA

Not applicable.
BIBLIOGRAPHY


APPENDIX

A. Photographs

1. "Big Trestle"

2 - 13. Existing Conditions -- Trestle No. 1

14 - 25. Existing Conditions -- Trestle No. 2

B. Drawings

1. Typical Trestle Construction ca. 1869

2. Typical Trestle Construction ca. 1938

3. Existing Conditions, Trestles No. 1 and 2

4. Existing Conditions -- Trestle No. 1

5. Existing Conditions -- Trestle No. 2

C. Maps

1. Historic Base Map
PLATE 1.

"Big Trestle." Photograph by Andrew J. Russell, May, 1869.
PLATE 2.

PLATE 3.

PLATE 4.

PLATE 5.
Trestle No. 1. Deck. Note deterioration of ties.

PLATE 6.
Trestle No. 1. Underside of deck.
PLATE 7.

Trestle No. 1. East bent.
PLATE 8.

PLATE 9.

PLATE 10.
Trestle No. 1. East bent. Note deterioration of girder ends.

PLATE 11.
Trestle No. 1. West bent. Note deterioration of piers.
PLATE 12.

Trestle No. 1. West bent. Note the precarious balance of the bent due to the two missing piers. Photograph by James C. Gott, 1971.
Plate 13.

Trestle No. 1. West bent. Note deterioration of bulkhead.
PLATE 14.
Trestle No. 2. South elevation.

PLATE 15.
Trestle No. 2. Southwest elevation.
PLATE 16.
Trestle No. 2. Bents 2 and 3. Note erosion of wash bed from original grade.

PLATE 17.
Trestle No. 2. Bent 2.
PLATE 18.

Trestle No. 2. Bent 3.
PLATE 19.

PLATE 20.

Trestle No. 2. Bent 3. Closeup of typical pile tip.
PLATE 21.

Trestle No. 2. Bed of wash at head of eroded area.
PLATE 22.

Trestle No. 2. Erosion of wash bed on north side of trestle.
PLATE 23.

Trestle No. 2. Eroded wash as it meets the newly constructed drainage channel.

PLATE 24.

Drainage channel.
PLATE 25.

Trestle No. 2. View of the trestle and wash from drainage channel.
FIG. 1  TYPICAL TIMBER TRESTLE CONSTRUCTION  CA. 1869
FIG. 2 TYPICAL TIMBER TRESTLE CONSTRUCTION CA. 1930
FIGURE 3. EXISTING CONDITIONS, TRESTLES 1 AND 2
This trestle has been dated to 1889 by the Southern Pacific Railroad, in general in neat that over the main line would date in this form. The combination of construction and the design of the truss are typical of typical Southern Pacific construction in the 1890s. See Figure 4. The east bank shows generally Northern construction found on the SP, to date the end of the 19th century. See existent new sheet. The west bank is bound by heavy construction, and over exists little for the exact view and the description of reconstructing Northern style.

This figure shows typical construction in the later 19th century.

The drawing shows little later to fairly modern to the 1930s. See the rest of the construction somewhat later to the 1930s. The west bank is somewhat later to the 1930s. The east bank is somewhat later to the 1930s. The west bank is somewhat later to the 1930s. The east bank is somewhat later to the 1930s. The west bank is somewhat later to the 1930s. The east bank is somewhat later to the 1930s. The west bank is somewhat later to the 1930s.
This trestle closely follows the configuration shown in figure 2. The only basic differences is the fact that this trestle are constructed of piling rather than timber members. The use of piling is necessary since other major construction features such as the retaining wall and drainage channel can be designed to the extent of the trestle. The layout in this case eliminates the drain in extent on either end of the design structure.

**Figure 5. Existing Conditions, Trestle 2**