	134
NPS Form 10-900 (Rev. 8-86)	OMB No. 1024-0018
United States Department of the Interior National Park Service	RECEIVED
NATIONAL REGISTER OF HISTORIC PLACE REGISTRATION FORM	ES OCT 2 8 1993 NATIONAL REGISTER
1. Name of Property	
historic name: <u>RED BRIDGE</u>	
other name/site number: <u>N/A</u>	
street & number: <u>Near Oregon Road over</u>	r <u>Quinnipiac River</u> not for publication: <u>N/A</u> vicinity:N/A
state: <u>CT</u> county: <u>New Haven</u>	_
3. Classification	
Ownership of Property: <u>public-local</u>	
Category of Property: <u>structure</u>	
Number of Resources within Property:	
Contributing Noncontributing	
buildings          sites          structures          objects          0	۰.
Number of contributing resources previous	ly listed in the National

Register: <u>0</u>

Name of related multiple property listing: \_\_\_\_N/A \_\_\_\_

4. State/Federal Agency Certification As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this X nomination \_ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property X meets \_\_\_\_ does not meet the National Register Criteria. \_\_\_\_ See cont. sheet. m Manna 10/22/93 Signature of certifying official Date Director, Connecticut Historical Commission State or Federal agency and bureau In my opinion, the property \_\_\_\_ meets \_\_\_\_ does not meet the National Register criteria. \_\_\_\_ See continuation sheet. Signature of commenting or other official Date State or Federal agency and bureau 5. National Park Service Certification \_\_\_\_\_ I, hereby certify that this property is: entered in the National Register \_\_\_\_ See continuation sheet. \_ determined eligible for the National Register \_\_\_\_ See continuation sheet. determined not eligible for the National Register \_ removed from the National Register \_\_\_\_\_ \_\_\_\_ other (explain): \_\_\_\_\_ ignature of Keeper Date of Action 6. Function or Use \_ Historic: TRANSPORTATION Sub: road-related NOT IN USE Sub: Current:

7. Descript				
	ral Classifi			=======================================
Other: len	ticular pony	truss		
Other Desc	ription: <u>N</u>	Ä		
Materials:	foundation walls	N/A N/A	_ roof _ other	N/A METAL: iron STONE
Describe p continuationsheet.		istoric physical	appearanc	e. <u>X</u> See
8. Statemer	nt of Signif	icance		
Certifying	official ha		significa	nce of this property in
Applicable	National Re	gister Criteria:	A,C	
Criteria Co	onsideration	s (Exceptions) :	N/A	
Areas of S:	ignificance:	ENGINEERING INDUSTRY		
Period(s) o	of Significa	nce: <u>1891</u>		
Significant	Dates: _	1891		
Significant	Person(s):	N/A		
Cultural Af	filiation:	N/A		
Architect/H	Builder: <u>Be</u>	rlin Iron Bridge	Company (	fabricator)

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.  $\underline{X}$  See continuation sheet.

United States Department of the Interior National Park Service

# NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Description Red Bridge Meriden, New Haven County, CT 7-1

Red Bridge, now closed to vehicular traffic, is a single-span wroughtiron lenticular pony truss built in 1891 by the Berlin Iron Bridge Company for the Town of Meriden, Connecticut (Photograph 1). It crosses the Quinnipiac River in a lightly developed section in the southern part of the town, with parkland, a hiking trail, and wooded banks upstream. The bridge measures 82 feet long, with a roadway width of 17 feet. The trusses are about 12' deep at their midpoint, and the bridge typically is 10 or 12 feet above water level. The ends of the bridge are supported on rubble abutments built of large brownstone blocks.

The five-panel truss follows the configuration, variously termed a lenticular or parabolic truss, patented in 1878 by the founders of the Berlin Iron Bridge Company. Viewed from the side, the top and bottom chords curve in opposite directions, creating a convex lens-shaped profile (Photograph 2). The end posts, upon which the top chord rests and from which the bottom chord is suspended, are large box girders built up from plates and angles, with the inside face joined by lacing bars; the top chord is of similar construction. The lower chord consists of a pair of flat stamped eyebars; in the end panels, additional stiffeners formed from paired angles connect the end posts and the first lower The uprights are tapered lattice girders, while the diagonals, joints. which cross at the midpoint of each panel, are rods with welded looped ends and turnbuckles for tensioning. The truss members are joined by means of large iron pins (Photograph 4). Plate-girder floor beams, which taper to a greater depth below the center of the roadway, are suspended by means of U-shaped threaded fasteners, called "hairpins," that loop over the lower-joint pins (Photograph 5). Stringers are iron channel sections, with timber nailers attached to their sides; the 2-ply woodenplank deck is spiked to the nailers.

The bridge currently lacks any decorative detail. However, remnants of iron castings on top of the end posts (Photograph 6) may represent bases for the urn-shaped finials found on other small bridges by the same company. The bridge's condition is generally fair, with some subsidence evident at the end posts, surface corrosion, and perforation of a few of the structural members. The wooden deck has been tarred over and has rotted away in several places (Photograph 3). The bridge has been closed for about 20 years. A new concrete bridge just downstream now carries Oregon Road over the river.

United States Department of the Interior National Park Service

# NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Significance Red Bridge Meriden, New Haven County, CT 8-1

#### Summary

Red Bridge is significant as a representative example of late 19thcentury bridge engineering (Criterion C) and as a product of the Berlin Iron Bridge Company, a major manufacturing concern and Connecticut's only large 19th-century bridge fabricator (Criterion A). Although the Berlin Iron Bridge Company built hundreds of bridges throughout the Northeast, relatively few have survived to the present; Red Bridge is one of only 15 remaining in the company's home state of Connecticut. Red Bridge embodies many distinctive characteristics of the early years of metaltruss design, including wrought iron as the principal material, pinned connections, and an unusual truss pattern. By 1900, all of these features had virtually disappeared from American bridge building. In their place, a standardized design emerged for small highway bridges based on the use of steel members, rivetted connections, and only two major truss patterns, the Warren and Pratt trusses. Red Bridge represents an increasingly rare survivor of the era before standardized design prevailed.

#### Engineering Significance

Red Bridge's lenticular truss was one of a myriad of patented designs that characterized the American bridge industry in its formative stage. In part such designs were an attempt to improve the technology of bridge building, but they also served to distinguish the products of one fabricator from another. Berlin Iron Bridge's design offered some savings of material over a comparably sized Pratt truss, though the savings must have been largely offset by the greater complexity in fabricating the curved top chord's multiple angles. Equally important, the design's unique profile provided something distinctive that Berlin agents could exploit when trying to convince local highway officials of their product's superiority. In other respects, the truss is similar to the vast majority of its contemporaries. In the early 1890s, steel was still in the process of replacing wrought iron for structural forms, so most bridges of the 1880s and early 1890s were built with wrought-iron Similarly, pinned connections were only beginning to give way members. to rivetted joints. Pinned connections were popular because they simplified the erection of the bridge, requiring only large wrenches to join prefabricated members instead of the more demanding technique of field rivetting. Many engineers also claimed that pinned joints allowed forces to be transferred less ambiguously, though all agreed that

8-2

United States Department of the Interior National Park Service

#### NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Significance Red Bridge Meriden, New Haven County, CT

rivetted bridges were more rigid. A final characteristic of the period evident in Red Bridge is the use of complicated details such as the tapered uprights and floor beams, both of which achieved a minor savings in material. Like the lenticular truss itself, such idiosyncratic details soon gave way to simpler, more standard forms.

#### Industrial History Significance: the Berlin Iron Bridge Company

Unlike most American bridge firms, which were closely tied to iron and steel makers, Connecticut's leading manufacturer of bridges began as an offshoot of the tinware industry. Roys and Wilcox, an East Berlin maker of tinner's tools and other metal-forming machines, set up a company in 1868 to market sheet-iron products made with its rolling machines. The Corrugated Metal Company, as it became known, produced roofing material and metal-clad firedoors and shutters; the company soon found itself involved in structural iron work when it began to provide roof trusses as well as the exterior material. The company was not particularly successful until a new investor in 1877, S. C. Wilcox, realized that the plant had the capacity to manufacture highway bridges. The following year, the Corrugated Metal Company purchased rights to William Douglas's patented truss and produced the first of the lenticular bridges that would soon dot the landscape of the Northeast. Douglas, educated at West Point, joined the company as Treasurer and Executive Manager and continued to refine his design; he was awarded a second patent in 1885, by which time the company had changed its name to the Berlin Iron Bridge Company.

The late 19th century was a good time to be in the bridge business. As the industry developed, the price of iron trusses steadily dropped until they were competitive with wooden spans, especially when their superior durability was figured in (wooden bridges had an average lifetime of about 25 years). The only other alternative, for shorter spans only, was building in stone, which remained very expensive. Throughout America, local highway officials opted to replace their wooden bridges with iron, and firms such as the Berlin Iron Bridge Company were happy to oblige.

At its height, the Berlin Iron Bridge Company was probably the largest structural fabricator in New England. Some 400 workers were employed at its East Berlin plant (no longer extant), with an equal number in the field during the erection season. There is no definitive count of the company's bridges, though at least 600 are known to have been completed

8-3

United States Department of the Interior National Park Service

### NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Significance Red Bridge Meriden, New Haven County, CT

during its first ten years. Most were in the Northeast, though even today Berlin trusses survive as far away as Texas. A few bridges were of tremendous size, such as the 1000'-long five-span bridge built in 1885 in Williamsport, Pennsylvania. Most, however, were single-span bridges, with through-trusses for lengths over 100 feet and pony trusses, such as Red Bridge, for shorter spans. The lenticular design accounted for the bulk of the company's output, though it is known to have produced several other truss types, sometimes to designs furnished by railroad or city engineers, as well as suspension bridges. Many towns brought the company repeated business; Waterbury, Connecticut, for example, bought more than a dozen Berlin bridges. The company also furnished structural iron for buildings, though bridges remained its mainstay.

The Berlin Iron Bridge Company was absorbed in 1900 by the American Bridge Company, a largely successful attempt by J. P. Morgan to monopolize the country's structural fabricating industry. The American Bridge Company made only marginal use of the East Berlin plant, preferring to concentrate production at other sites, and in 1917 it demolished the East Berlin shops entirely. By that time, however, a firm started by former Berlin Iron Bridge employees, the Berlin Construction Company, had regained much of its predecessor's influence in the New England bridge market; it remains in business today as Berlin Steel.

Of the hundreds of bridges known to have been built in Connecticut by the Berlin Iron Bridge Company, no more than 15 lenticular trusses survive. Red Bridge is thus one of a dwindling number of heritage resources left to illustrate this important chapter in Connecticut industrial history.

#### <u>Historical Background of Red Bridge</u>

Like most Berlin bridges, Red Bridge was commissioned by local highway officials to replace a wooden bridge on a town road. At that time, Oregon Road was the principal route between the densely built-up area of Meriden, which had been set off under a separate city charter in 1879, and the Town of Cheshire, which lies to the southwest. The Town of Meriden paid \$6,515 to the Berlin Iron Bridge Company in 1891, a figure that suggests that more than one bridge was purchased. The name "Red Bridge" is a traditional name for the crossing that was also applied to the present Red Bridge's wooden-truss predecessor.

· Maion Dibliognophical Deferrences	
9. Major Bibliographical References	
<u>X</u> See continuation sheet.	
Previous documentation on file (NPS):	
<ul> <li>preliminary determination of individual list requested.</li> <li>previously listed in the National Register</li> <li>previously determined eligible by the National designated a National Historic Landmark</li> <li>recorded by Historic American Buildings Surve recorded by Historic American Engineering Ref</li> </ul>	al Register ey #
Primary Location of Additional Data:	
_ Federal agency 24 Wolcott	t Dept. of Transportation Hill Road ld, CT 06109
IO. Geographical Data         Acreage of Property:       less than one         UTM References:       Zone Easting Northing       Zone Easting	
See continuation sheet.	
Verbal Boundary Description: See continuat The nominated property includes the bridge	tion sheet. e, abutments, and roadway
Boundary Justification: See continuation s The boundary includes only the components	
11. Form Prepared By - Reviewed by John Herzan, Nat	ional Register Coordinator
Name/Title:Bruce Clouette and Maura Cron	
Organization: <u>Historic Resource Consultants</u>	Date: <u>April 1, 1993</u>
Street & Number: <u>55 Van Dyke Avenue</u>	Telephone: <u>203-547-0268</u>
City or Town: <u>Hartford</u>	State: <u>CT</u> Zip: <u>06106</u>

United States Department of the Interior National Park Service

# NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Bibliography Red Bridge 9-1 Meriden, New Haven County, CT

- Berlin Iron Bridge Co., <u>Catalog</u>, 1889 and c.1894, courtesy Victor Darnell.
- Connecticut Department of Transportation. Historic Bridge Inventory. 1991.
- Darnell, Victor. "Lenticular Bridges from East Berlin, Connecticut," <u>Industrial Archeology</u> 5 (1979): 19-32.

Town of Meriden, Annual Report, 1892, p. 37.

"The Plant of the Berlin Iron Bridge Co.," <u>Engineering News</u> (October 3, 1891): 87-91.

United States Department of the Interior National Park Service

### NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Photographs Red Bridge Meriden, New Haven County, CT

Photos-1

#### All photographs:

- 1. Red Bridge
- 2. Meriden, New Haven County, CT
- 3. Photo Credit: HRC, Hartford, CT
- 4. April, 1993
- 5. Negative filed with Connecticut Historical Commission Hartford, CT

Captions:

South side elevation of bridge, camera facing north Photograph 1 of 6

North side elevation of bridge, camera facing southeast Photograph 2 of 6

Roadway, camera facing northeast Photograph 3 of 6

Detail of upper joint, camera facing southwest Photograph 4 of 6

Detail of lower joint, camera facing northeast Photograph 5 of 6

Detail of southwest end post, camera facing north Photograph 6 of 6