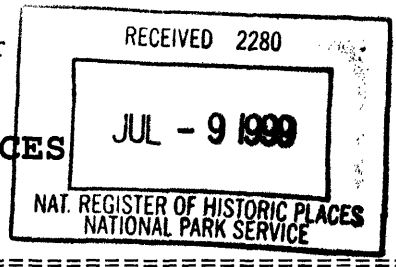
NPS Form 10-900
(Rev. 8-86)

OMB No. 1024-0018

United States Department of the Interior
National Park Service



922

NATIONAL REGISTER OF HISTORIC PLACES REGISTRATION FORM

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1. Name of Property

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historic name: **MELROSE ROAD BRIDGE**

other name/site number: N/A

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2. Location

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street & number: Melrose Road over Scantic River

not for publication: N/A

city/town: East Windsor vicinity: N/A

state: CT county: Hartford code: 003 zip code: 06049

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3. Classification

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Ownership of Property: public-local

Category of Property: structure

Number of Resources within Property:

Contributing	Noncontributing	
		buildings
		sites
1		structures
		objects
1	0	Total

Number of contributing resources previously listed in the National Register: 0

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.

John W. Shannahan 06/30/99

Signature of certifying official Date

John W. Shannahan, 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 Edson H. Beall 8-5-99
___ 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): _____

Signature of Keeper Date of Action

6. Function or Use

Historic: TRANSPORTATION Sub: road-related

Current: Not in use Sub:

7. Description

Architectural Classification:

Other: lenticular pony truss

Other Description: N/A

Materials: foundation _____ roof _____
walls _____ other METAL: iron
_____ STONE

Describe present and historic physical appearance. X See continuation sheet.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties: state.

Applicable National Register Criteria: A,C

Criteria Considerations (Exceptions) : N/A

Areas of Significance: ENGINEERING
INDUSTRY

Period(s) of Significance: 1878-1900

Significant Dates: 1888

Significant Person(s): N/A

Cultural Affiliation: N/A

Architect/Builder: Berlin Iron Bridge Company (fabricator)

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.
X See continuation sheet.

The Melrose Road Bridge (Photographs 1-3) is a single-span lenticular pony truss built in 1888 by the Berlin Iron Bridge Company for the Town of East Windsor, Connecticut. It crosses the Scantic River in a wooded area of the town and is currently closed. The four-panel wrought-iron bridge measures 63 feet long and is one lane (12 feet) wide. It rests on stone abutments constructed of large, irregularly shaped brownstone blocks (Photograph 4).

The bridge has pinned connections, except at the ends of the lower chord, which are secured at the end posts with large nuts (Photographs 4-5). Both end posts and the curved upper chord consist of 6" by 10" box girders. The lower chord, which imparts the bridge's distinctive lens-shaped profile by slanting up to meet the upper chord at the top of the end posts, consists of a pair of 2 1/2" eyebars. The bridge is braced at the end panels by a pair of angles connecting the end posts and the first lower panel points. The truss's vertical members are lattice girders that taper inward to fit inside the top chord's box girders. Diagonals in the center panel are 1 1/4" tension rods with turnbuckles. Plate-girder floor beams are suspended from the lower joints by "hairpins," long threaded U-bolts that are secured to the floor beams' lower flanges with plates and nuts. The floor beams taper to greater depth under the center of the roadway. The beams are cross-braced with tension rods below the roadway. Little remains now of the roadway, which originally consisted of timber stringers and a wood-plank deck. A single run of cable mounted to the inside of the trusses provides the only guardrail; there is no evidence of any other railing.

Except for the loss of the roadway deck and stringers, the bridge does not appear to be substantially deteriorated, given its age. However, there currently are no plans to rehabilitate it, even for pedestrian use, and two guardrails have been welded across each end to further discourage trespass.

Summary

The Melrose Road Bridge is significant as a representative example of late 19th-century 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; the Melrose Road Bridge is one of 15 remaining lenticular trusses in the company's home state of Connecticut, two of which are scheduled to be demolished. Although it is no longer in service, the bridge has undergone only minor modifications and, except for the deteriorated roadway, retains much of its original appearance intact.

The Melrose Road Bridge embodies many distinctive characteristics of the early years of metal-truss design, including wrought iron as the principal material, pinned connections, and an unusual patented 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, riveted connections, and only two major truss patterns, the Warren and the Pratt trusses. The Melrose Road Bridge thus represents a rare survivor of the era before standardization prevailed.

Engineering Significance

The Melrose Road Bridge's lenticular truss was one of several patented designs that characterized the American bridge industry in its formative stage. In part, such patents were an attempt to improve the technology of bridge building, but they also served to distinguish the products of one fabricator from another. The Berlin Iron Bridge Company's "parabolic truss" offered some savings of material over a comparably sized Pratt truss, even though the savings must have been somewhat 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. Steel had not yet replaced wrought iron for structural forms, so most bridges of the 1880s and early 1890s were built with wrought-iron members; although it was substantially stronger, steel

took some time to become cost-competitive. Similarly, pinned connections were only beginning to give way to riveted joints in that period. 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 load forces to be transferred less ambiguously, though all agreed that riveted bridges were more rigid. A final characteristic of the period evident in the Melrose Road Bridge is the use of unusual details, such as the tapered uprights and floor beams, both of which achieved a minor savings in material at the cost of greater fabrication complexity. Like the lenticular truss itself, such idiosyncratic details soon gave way to simpler, more standard forms.

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 parabolic truss and produced the first of the lenticular bridges that would soon dot the landscape of the Northeast. Douglas, an engineer 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 rarely lasted more than 25 years). The only other alternative, for shorter spans only, was building in stone, which remained very expansive. 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 many other employees in the field during the construction season. There is no definitive count of the company's bridges, though at least 600 are known to have been completed during its first ten years, and the company claimed more than 1,000. Most were in the Northeast, though even today Berlin trusses survive as far away as Texas. 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 ironwork for buildings and for specialized industrial structures.

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 capacity. Immediately thereafter, former Berlin Iron Bridge employees started a new firm, the Berlin Construction Company, which quickly regained much of its predecessor's share of the New England bridge market (though with conventional riveted trusses rather than lenticular spans). The latter company remains in business today and is known as Berlin Steel.

Historical Background

Like other Connecticut towns in the late 19th century, East Windsor replaced many of its wooden bridges with iron spans. The cost was attractive, especially given the short life of wooden bridges and their greater susceptibility to destruction during high water. Although the immediate surroundings of the Melrose Road Bridge consisted of woods and farmland, the town had several manufacturing sites nearby, particularly at Broad Brook, that may have resulted in greater strain on the town's bridges.

The history of this span aptly illustrates the operation of the bridge business in the late 19th century. The Berlin Iron Bridge Company, like its competitors, would either supply just the truss members or agree to erect the bridge as well. The Town of East Windsor chose simply to buy the truss, which cost $750. Then it hired a local contractor, George S. Phelps, to erect the bridge. Phelps picked up the truss components, which were probably shipped to a nearby railroad depot, built the stone abutments, and erected the iron, for which he

received $1,484. Other contractors were paid $463 for additional items such as the wood planking. Since the Berlin Iron Bridge Company usually charged around $20 per foot for a completely erected bridge, the town appears to have paid a great deal more than it needed to, a circumstance perhaps mitigated by the fact that Phelps and the others were local residents: the total cost of the bridge may have been higher than necessary, but most of the money stayed in town.

9. Major Bibliographical References

_X_ See continuation sheet.

Previous documentation on file (NPS):

_ preliminary determination of individual listing (36 CFR 67) has been requested.
_ previously listed in the National Register
_ previously determined eligible by the National Register
_ designated a National Historic Landmark
_ recorded by Historic American Buildings Survey # _____
_ recorded by Historic American Engineering Record # _____

Primary Location of Additional Data:

_ State historic preservation office
X Other state agency
_ Federal agency
_ Local government
_ University
_ Other -- Specify Repository: _____

Connecticut Dept. of Transportation
2800 Berlin Turnpike
Newington, Connecticut 06111

10. Geographical Data

Acreage of Property: less than one acre

UTM References:

	Zone	Easting	Northing		Zone	Easting	Northing
A	18	703320	4645640	B	__	_____	_____
C	__	_____	_____	D	__	_____	_____

___ See continuation sheet.

Verbal Boundary Description: ___ See continuation sheet.
The nominated property includes the bridge and its abutments.

Boundary Justification: ___ See continuation sheet.
The boundary includes only the components of the bidge itself.

11. Form Prepared By

Name/Title: Bruce Clouette and Hoang Tinh, reviewed by John Herzan, Conn. Hist. Commission

Organization: Historic Resource Consultants Date: April 8, 1998

Street & Number: 55 Van Dyke Avenue Telephone: 860-547-0268

City or Town: Hartford State: CT Zip: 06106

Berlin Iron Bridge Company. Catalog, 1889.

Clouette, Bruce and Matthew Roth. ***Connecticut's Historic Highway Bridges***. Connecticut Department of Transportation: 1991.

Connecticut Department of Transportation. Historic Bridge Inventory. 1991.

Darnell, Victor. "Lenticular Bridges from East Berlin, Connecticut," ***Industrial Archeology*** 5 (1979): 19-32.

East Windsor, Town of. ***Annual Report***, 1888, p.3.

Roth, Matthew. ***Connecticut: An Inventory of Historic Engineering and Industrial Sites***. Society for Industrial Archeology: 1981.

"The Plant of the Berlin Iron Bridge Company," ***Engineering News*** 3 (October 3, 1891): 87-91.

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

All photographs:

1. Melrose Road Bridge
2. East Windsor, Hartford County, CT
3. Historic Resource Consultants Photograph
4. April, 1998
5. Negative filed with Connecticut Historical Commission Hartford, CT

Captions:

Overview of bridge from east end, camera facing northwest
Photograph 1 of 6

North elevation, camera facing south
Photograph 2 of 6

South elevation, camera facing north
Photograph 3 of 6

Detail of stonework, east abutment, camera facing northeast
Photograph 4 of 6

Detail of end post, showing nuts securing lower chord, east end, camera facing northwest
Photograph 5 of 6

Detail of lower joint, north side, camera facing northwest
Photograph 6 of 6