Maryland Historical Trust

Maryland Inventory of Historic Properties Number: CAR-302

Name: Boyce Mill Road over Gravelly Run

The bridge referenced herein was inventoried by the Maryland State Highway Administration as part of the Historic Bridge Inventory, and SHA provided the Trust with eligibility determinations in February 2001. The Trust accepted the Historic Bridge Inventory on April 3, 2001. The bridged received the following determination of eligibly.

MARYLAND HISTORICAL TRUST

Eligibility Recommended ___X____ Eligibility Not Recommended _____

Criteria: ____A ____B ____C ____D Considerations: ___A ___B ___C ___D ___E ___F ___G __None

Comments:_____

_____

_____

Reviewer, OPS:__Anne E. Bruder_____ Date:__3 April 2001_____

Reviewer, NR Program:_Peter E. Kurtze_____ Date:___3 April 2001_____

MARYLAND INVENTORY OF HISTORIC BRIDGES **MHT No.** CAR-302
HISTORIC BRIDGE INVENTORY
MARYLAND STATE HIGHWAY ADMINISTRATION/
MARYLAND HISTORICAL TRUST

SHA Bridge No. CO-13 **Bridge name** Boyce Mill Road over Gravelly Branch

LOCATION:
Street/Road name and number [facility carried] Boyce Mill Road

City/town Three Corners **Vicinity** X

County Caroline

This bridge projects over: Road____ **Railway**_____ **Water** X **Land** ____

Ownership: State _____ **County** X **Municipal** _____ **Other** _____

HISTORIC STATUS:
Is the bridge located within a designated historic district? Yes _____ **No** _____
National Register-listed district ____ **National Register-determined-eligible district** __
Locally-designated district _____ **Other** _____

Name of district _____

BRIDGE TYPE:
Timber Bridge _____:
Beam Bridge _____ **Truss -Covered** ___ **Trestle** ____ **Timber-And-Concrete** ___

Stone Arch Bridge _____

Metal Truss Bridge _____

Movable Bridge _____:
Swing _____ **Bascule Single Leaf** __ **Bascule Multiple Leaf** _____
Vertical Lift _____ **Retractile**_____ **Pontoon** _____

Metal Girder_____:
Rolled Girder _____ **Rolled Girder Concrete Encased** _____
Plate Girder _____ **Plate Girder Concrete Encased** _____

Metal Suspension _____

Metal Arch _____

Metal Cantilever _____

Concrete X:
Concrete Arch X **Concrete Slab**_____ **Concrete Beam** ____ **Rigid Frame** _____
Other _____ **Type Name** _____

DESCRIPTION:

Setting: Urban _____ **Small town** _____ **Rural** ___X___

Describe Setting:

Bridge CO-13 carries Boyce Mill Road over Gravelly Branch in Caroline County. Boyce Mill Road runs north-south and Gravelly Branch flows east to west at the location of the bridge. The bridge is located in the vicinity of Three Corners and is surrounded by woodland.

Describe Superstructure and Substructure:

Bridge CO-13 is a 1-span, 2-lane, filled spandrel concrete arch bridge. The bridge, built in 1919, is 12.5 meters (41 feet) long and has a clear roadway width of 6 meters (19.75 feet); there are no sidewalks. The out-to-out width is 6.9 meters (22.5 feet). The north approach roadway is 6.2 meters (20.5 feet) wide, while the south approach roadway is 5.1 meters (17 feet) wide. The approaches do not have guardrails. The superstructure consists of one concrete barrel arch, with a span of 12.5 meters (41 feet), which supports a concrete deck and concrete parapets. The concrete deck is of varying thickness and it has a bituminous wearing surface. The solid panel concrete parapets are .8 meters (2.5 feet) in height and are integral with the structure. A bronze plaque located on the east parapet states, "1919, Luten Bridge Co., York, PA." The substructure consists of two concrete abutments and four concrete wingwalls. The bridge has a sufficiency rating of 67.8.

According to the 1995 inspection report, this structure was in satisfactory condition. The concrete arch has cracks, spalls and scaling. The parapets have minor collision damage to all corners and minor spalls throughout. The wingwalls are in satisfactory condition with minor cracking and scaling. The top of the northeast wingwall has several surface spalls.

Discuss Major Alterations:

There is no record of any major alterations to Bridge CO-13.

HISTORY:

WHEN was the bridge built: 1919
This date is: Actual ___X___ **Estimated** _____
Source of date: Plaque ___X___ **Design plans** ____ **County bridge files/inspection form** ___X___
Other (specify): _____

WHY was the bridge built?

The bridge was constructed in response to the need for more efficient transportation network and increased load capacity.

WHO was the designer?

Luten Bridge Company of York, Pennsylvania

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WHO was the builder?

Luten Bridge Company of York, Pennsylvania

WHY was the bridge altered?

N/A

Was this bridge built as part of an organized bridge-building campaign?

There is no evidence that the bridge was built as part of an organized bridge building campaign.

SURVEYOR/HISTORIAN ANALYSIS:

This bridge may have National Register significance for its association with:
A - Events X **B- Person** _____
C- Engineering/architectural character X

The bridge was determined eligible for the National Register of Historic Places by the Interagency Review Committee in February 1996.

Was the bridge constructed in response to significant events in Maryland or local history?

The advent of modern concrete technology fostered a renaissance of arch bridge construction in the United States. Reinforced concrete allowed the arch bridge to be constructed with much more ease than ever before and maintained the load-bearing capabilities of the form. As the structural advantages of reinforced concrete became apparent, the heavy, filled barrel of the arch was lightened into ribs. Spandrel walls were opened, to give a lighter appearance and to decrease dead load. This enabled the concrete arch to become flatter and multi-centered, with longer spans possible. Designers were no longer limited to the semicircular or segmental arch form of the stone arch bridge. The versatility of reinforced concrete permitted development of a variety of economical bridges for use on roads crossing small streams and rivers.

Maryland's roads and bridge improvement programs mirrored economic cycles. The first road improvement of the State Roads Commission was a 7 year program, starting with the Commission's establishment in 1908 and ending in 1915. Due to World War I, the period from 1916-1920 was one of relative inactivity; only roads of first priority were built. Truck traffic resulting from war related factories and military installations generated new, heavy traffic unanticipated by the builders of the early road system. From 1920-1929, numerous highway improvements occurred in response to the increase in Maryland motor vehicles from 103,000 in 1920 to 320,000 in 1929, with emphasis on the secondary system of feeder roads which moved traffic from the primary roads built before World War I. After World War I, Maryland's bridge system also was appraised as too narrow and structurally inadequate for the increasing traffic , with plans for an expanded bridge program to be handled by the Bridge Division, set up in 1920. In 1920 under Chapter 508 of the Acts of 1920 the State issued a bond of $3,000,000.00 for road construction; the primary purpose of these monies was to meet the state obligations involving the construction of rural post roads. The secondary purpose of these monies was to fund (with an equal sum from the counties) the building of lateral roads. The number of hard surfaced roads on the state system grew from 2000 in 1920 to 3200 in 1930.

CAC-302

By 1930, Maryland's primary system had been inadequate to the huge freight trucks and volume of passenger cars in use, with major improvements occurring in the late 1930's.

As the nation's automotive traffic increased in the early twentieth century, local road networks were consolidated, and state highway departments were formed to supervise the construction and improvement of state roads. With a diverse topographical domain encompassing numerous small and large crossings, Maryland engineers quickly recognized the need for expedient design and construction through the standardization of bridge designs.

The concept and practice of standardization was one of the most important developments in engineering of the twentieth century. In Maryland, as in the rest of the nation, the standardized concrete types became the predominant bridge types built. In the period 1911 to 1920 (the decade in which standardized plans were introduced), beams and slabs constituted 65 percent and arches 35 percent of the extant 29 bridges built in Maryland during this period. In the following decade, 1921-1930, the beam (now the T-beam) and slab increased to 73 percent and the arch had declined to 27 percent of the 129 extant bridges; in the next decade (1931-1940), the beam and slab achieved 82 percent and arches had further declined, constituting only 18 percent of the total of extant bridges built on state-owned roads between 1931 and 1946.

Although beam and slab bridges became the utilitarian choice, it appears that the arch was selected when aesthetic as well as other site conditions were considered. The architectural treatment of extant arch bridges supports this assessment. Many of these bridges were multiple span structures with open spandrels or masonry facing. Another decorative feature of the concrete arch bridge was an open, balustrade-style parapet. Despite the popularity of ornamental arches and the increase in use of beam and slab bridges, examples of simpler, single and multiple span closed concrete arch bridges with solid parapets continued to be constructed throughout the early twentieth century.

Bridge CO-13 was constructed by the Luten Bridge Company in 1919. Daniel B. Luten's patented bridges were built throughout the eastern and midwestern United States. From 1895 to 1900, Luten was instructor of civil engineering at Purdue University, and in 1900 he resigned to design bridges. One year later, he was designing and patenting his designs. Luten patents, totaling over 30, included numerous variations, among them a hinged arch and viaducts; systems of reinforcement; ingenious centering forms and methods; methods of bridge construction; and reinforced concrete beams.

By 1919, Luten claimed to have designed some 17,000 arches and stated that examples of his designs could be found in all but three states of the Union. Indiana alone had some 2,000 Luten arches. Luten arch bridges known to have been built in Maryland often featured curved, simply ornamented solid parapets, similar to the parapets on Bridge CO-13. Characterized by the graceful arch and curved, incised solid parapets, this bridge type was described in Luten Company catalogs as "Highway Bridge of Plain Design." This type of concrete arch was widely built as a proprietary type in the first quarter of the twentieth century. Luten's "Park Bridge of Attractive Design" also influenced concrete arch design in Maryland. Variations in the Luten style arch and parapet detail soon developed and resulted in similar nonproprietary designs prepared by highway department staffs.

When the bridge was built and/or given a major alteration, did it have a significant impact on the growth and development of the area?

There is no evidence that the construction of this bridge had a significant impact on the growth and development of this area.

CAR-302

Is the bridge located in an area which may be eligible for historic designation and would the bridge add to or detract from the historic/visual character of the potential district?

Unknown

Is the bridge a significant example of its type?

The bridge is a significant example of a concrete arch bridge, possessing a high degree of integrity.

Does the bridge retain integrity of important elements described in Context Addendum?

The bridge retains the character-defining elements of its type, as defined by the Statewide Historic Bridge Context, including the arch ribs, spandrel wall, concrete parapet, abutments and wingwalls.

Is the bridge a significant example of the work of a manufacturer, designer, and/or engineer?

This bridge was designed by a significant bridge design company, the Luten Bridge Company. The style of bridge was referred to in the company's literature as a "Highway Bridge of Plain Design."

Should the bridge be given further study before an evaluation of its significance is made?

No further study of this bridge is required to evaluate its significance.

BIBLIOGRAPHY:

County inspection/bridge files X **SHA inspection/bridge files** _____
Other (list): _____

Johnson, Arthur Newhall
1899 The Present Condition of Maryland Highways. In *Report on the Highways of Maryland*. Maryland Geological Survey, The Johns Hopkins University Press, Baltimore.

P.A.C. Spero & Company and Louis Berger & Associates
1995 Historic Highway Bridges in Maryland: 1631-1960: Historic Context Report. Maryland State Highway Administration, Maryland State Department of Transportation, Baltimore, Maryland.

Tyrrell, H. Grattan
1909 *Concrete Bridges and Culverts for Both Railroads and Highways*. The Myron C. Clark Publishing Company, Chicago and New York.

SURVEYOR:

Date bridge recorded December 1997
Name of surveyor Wallace, Montgomery & Associates / P.A.C. Spero & Company
Organization/Address P.A.C. Spero & Co., 40 W. Chesapeake Avenue, Baltimore, MD 21204
Phone number (410) 296-1635 **FAX number** (410) 296-1670

Bridge Type CONCRETE ARCH
MHT# CAR-302
Map E-11a GREENSBORO
County CAROLINE
Bridge # and name CO 13: BOYCE MILL RD. OVER GRAVELLY BRANCH

CH'ORTANK
DRAPERS
IRWIN
CHAPEL
RD
BILBOURGH
RD
BOYCE
MILL
ROAD
THREE CORNERS
NO.37
RED
BRIDGES
RD
SEWELL
MILLS
RIVER
CHRISTIAN
PARK
ROAD
Gravelly
MRYTLE SIMON PELOT
BIRD SANCTUARY
Heyron
Run
MASON
AND
DIXON
LINE
MILL
ROAD
Branch
DRAPERS
BOYCE
MILL
ROAD
Little
Gravelly
Branch
PLUMMERS
LANE
Gravelly
Branch
314
WHITELEYSBURG
ROAD
Branch
FOUR CORNERS
280
314
WHITELEYSBURG
ROAD
SPIGOTS
WHITELEYSBU

RESTRICTED BRIDGE
SINGLE UNIT
30 000 LBS GVW
COMBINATION UNIT
50 000 LBS GCW

CAR-302
CAROLINE COUNTY
MATT HICKSON
3-16-95
~~MARYLAND SHPO~~ SHA
BRIDGE CO-13, LOOKING NE
1 OF 5

CAR-302
CAROLINE COUNTY
MATT HICKSON
3-16-95
~~MARYLAND SHPO~~ SHA
BRIDGE CO-13, LOOKING SW
2 OF 5

1919
BRIDGE CO.
KARK. PA.

CAR-302
CAROLINE COUNTY
MATT HICKSON
3-16-95
~~MARYLAND SHPO~~ SHA
BRIDGE CO-13, PLAQUE ON DOWNSTREAM PARAPET
3 OF 5

CAR-302
CAROLINE COUNTY
MATT HICKSON
3-16-95
~~MARYLAND SHPO~~ SHA
BRIDGE CO-13, LOOKING UPSTREAM (SE)
4 OF 5

CAR-302
CAROLINE COUNTY
MATT HICKSON
3-16-95
~~MARYLAND SHPO~~ SHA
BRIDGE CO-13, LOOKING DOWNSTREAM (NW)
5 OF 5