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A SURVEY AND PHOTOGRAPHIC INVENTORY OF METAL TRUSS BRIDGES IN VIRGINIA 1865-1932

IV. The Fredericksburg Construction District

by

Dan Grove Deibler
Research Analyst

(The opinions, findings, and conclusions expressed in this report are those of the author and not necessarily those of the sponsoring agencies.)

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SUMMARY

Prior to 1932, road maintenance and construction in Virginia was largely the responsibility of the individual county governments. Bridge construction projects, based on local requirements, formed a natural part of these activities. Local responsibility very often resulted in a rich variety of bridge designs built by an equally diverse group of bridge companies. The following report on the 14 counties that make up the Fredericksburg Construction District discusses the diversity found in just one of the popular nineteenth century bridge types — the metal truss bridge.

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As described in Part I of this series, the Virginia Highway and Transportation Research Council's project dealing with the history and development of road and bridge building technology in Virginia includes a photographic survey and documentary inventory of the state's remaining metal truss bridges. The purpose of this photographic survey is to record the surviving trusses before the form becomes the next victim of assumed obsolescence and benign neglect and disappears from the American landscape. The research has also been directed toward relating these structures to developments in truss design and technology of the nineteenth century, as well as toward obtaining information on the numerous bridge companies which specialized in truss technology and bridge construction during the same period. This information, discussed in more detail in Part I, will then be used to establish a set of guidelines to aid in evaluating the historical and technological significance of any of the bridges before they are replaced in a sometimes rigid construction schedule.

The project is concerned with trusses designed and built prior to 1932 because, until that year, each county was responsible for the construction and maintenance of its own road system. Since each county was left to its own devices, bridge construction was conducted on a rather individual basis. There were no applicable or mandatory state-wide standards; county officials could pick designs and choose bridge companies as they wished. However, the survey results for the Fredericksburg Construction District (see Figure 1), in contrast to those for the Staunton and Culpeper Districts, do not clearly illustrate this variety. The 14 counties comprising the Fredericksburg District have only seven truss spans which date prior to 1932. (See Table 1.)

2810

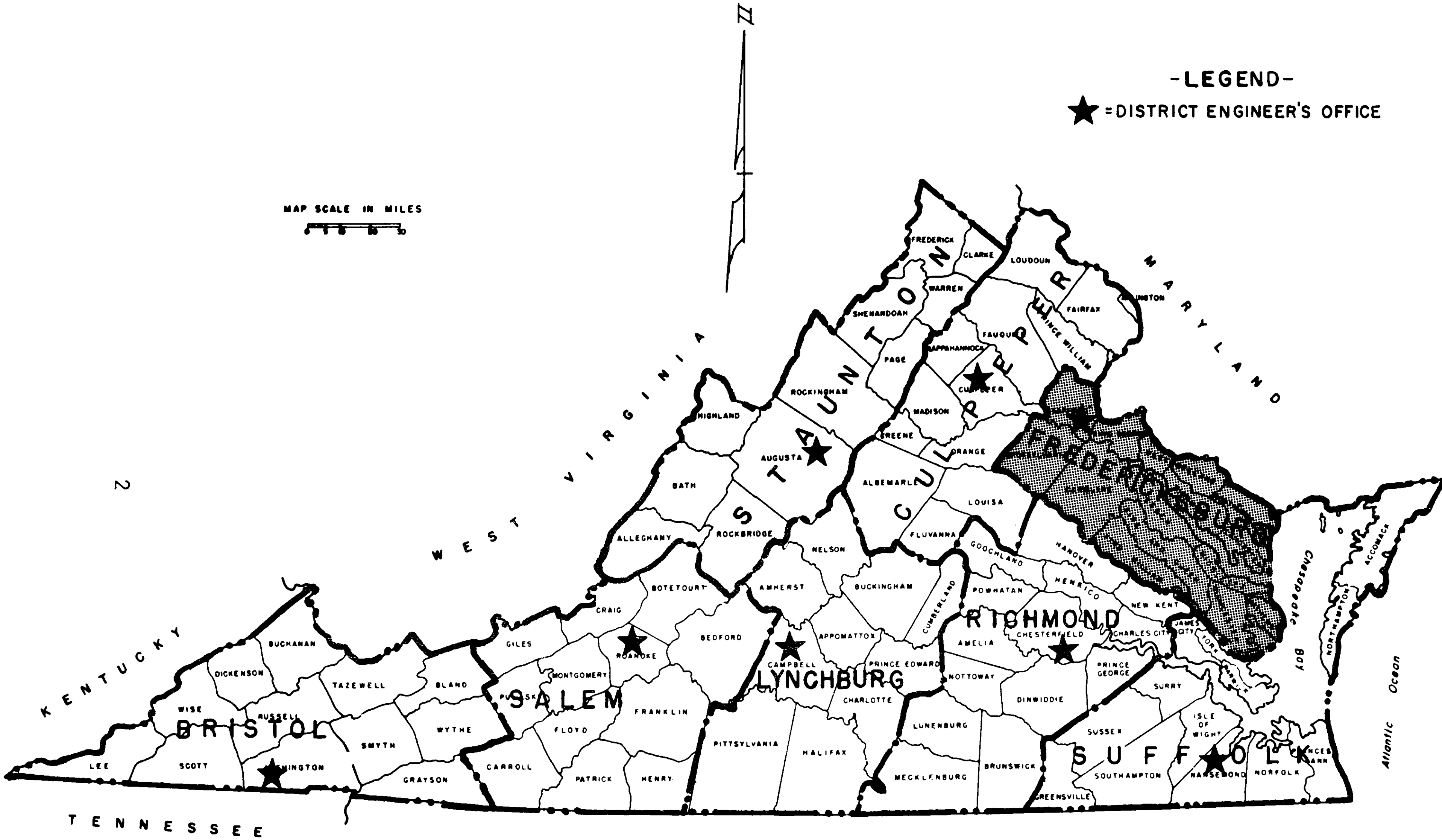

Figure 1. Fredericksburg Construction District map outline.

This small number of truss spans presents a problem for the method of analysis used in the previous reports. Instead of having to discuss the survey results in general terms, e.g., "majority" or percent values, the trusses can be examined individually and the numbers dealt with themselves. It would be meaningless to try to form any conclusions from the Fredericksburg survey, except as a part of the whole project. In the earlier District reports, the statistics compiled from the surveys were evaluated in terms of how the extant trusses deviated from or substantiated what were observed to be the general characteristics in truss design and technology going into the twentieth century. Since five of the seven truss spans in the District were designed between 1910 and 1927 and the remaining two suggest a comparable date, the normal evaluation technique will have to be modified.

The mass production of standardized parts and shapes by a limited number of steel manufacturers was so extensive by the first decade of the twentieth century that truss design attained a highly uniform character, regardless of which particular bridge company designed and fabricated a bridge. According to J. A. L. Waddell in his 1884 work on bridge building and truss design,[1] fully 90% of all highway truss bridges being built in the 1890's were of either the Pratt or Whipple types; specific features as well had been adopted to the exclusion of others. Waddell maintained the superiority of certain details and features over others: inclined end posts/batter braces were much superior to vertical ones; lacing bars were superior to latticing; and pin connections were superior to riveted ones. He also enumerated a schedule relating span length to truss type and connection detail:

Span Length	Recommended Truss Type; Connection
65-90 feet	Low/pony; pin
90-200 feet	Through/high; pin
200- feet	Through/high with polygonal top chords; ----

Prior to the 1890's it also had been common to find trusses that included a variety of structural material, e.g., wood, cast iron, wrought iron, or steel; however, as steel became economically competitive and more readily available, those "combination" truss bridges quickly became obsolete.

As previously stated, these trends and characteristics in nineteenth century truss design have to be applied with a great deal of caution when discussing trusses that reflect twentieth century technology. Steel became the exclusive material in structural design, and continued improvements in its strength and quality

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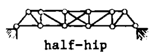
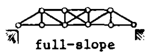
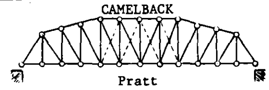
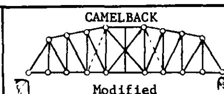
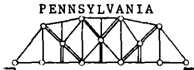
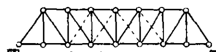
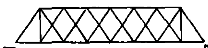
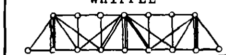
Table 1. Truss Types in the Fredericksburg District.

TRUSS TYPE / COUNTY	LOW (Pony)					
	PRATT  half-hip	PRATT  full-slope	TRIANGULAR 	TRUSS LEG/BEDSTEAD 	CAMELBACK  Pratt	CAMELBACK  Modified
CAROLINE COUNTY						
KING WILLIAM COUNTY		1 - 1910 1 - 1919				
NORTHUMBER-LAND COUNTY		1 - ND				
SPOT-SYLVANIA COUNTY		1 - ND				
WESTMORE-LAND COUNTY			1 - 1927			
TOTAL		4	1			

THROUGH (High)

ND - no date.
* - stylistic attribution.

PENNSYLVANIA  Petit	PRATT  single-intersection	TRIANGULAR  single-intersection	TRIANGULAR  double-intersection	WHIPPLE  double-intersection	TOTAL
	1 - ND				1
	1 - 1919				3
					1
					1
					1
	2				7

enabled longer spans to be achieved with a more efficient use of material. Riveting became the standard connection method as improved field techniques demonstrated the advantages in speed and reliability that riveted connections achieved over pin connections. Since no truss in the Fredericksburg District has a documented date earlier than 1910, it is reasonable to assume that the character of the structures reflects the newer technology. However, this assumption is not decisively validated.

The 7 trusses found in the Fredericksburg District exhibit most of the characteristics observed in the trusses from the other Districts: included are both through and low trusses (Figures 2 and 3) with pin or riveted connections (Figures 4 and 5), inclined end posts/batter braces (see Figure 3), polygonal or horizontal top chords (Figures 6 and 7), die-forged or loop-welded eye bars (Table 2) as well as lacing bars, and stay plates or latticing (Figures 8 and 9). There are no trusses that have vertical end posts nor are there any low/pony trusses of the half-hip configuration. Only one of the trusses is not a Pratt type. This single exception is a low triangular Camelback truss with riveted connections and is the only example of a swing bridge surveyed to date. It was designed and built in 1927 and reflects this advanced date in every respect — massive members, riveted connections, and a two-lane roadway. The only other rivet connected truss was built in 1919 and is the approach span on a two-span truss bridge. Oddly enough, the main span of this bridge is a pin connected through/high Pratt-type truss. There is no obvious reason for the different connection features in the same bridge. Both of these bridges were designed by the Virginia State Highway Commission. One of the trusses utilizes latticed posts, a feature associated with older technology, as are the stay plates found on its top chords and end posts. Though the original date of design and construction is not known, there is a record of its relocation in 1937.

The general lack of variety in truss types and features in the District is largely the result of the very limited number of bridge companies or agencies which designed and built them (Table 3). Three trusses were designed by the Virginia State Highway Commission and fabricated by either the Roanoke Iron & Bridge Works or the Virginia Bridge & Iron Company, both of Roanoke, Virginia. Two other trusses were built by the Roanoke Iron & Bridge Works, while the builders of the remaining two trusses are unidentified.

Two of the trusses fall outside of the span-length/truss-type schedule that Waddell recommended. Both are low/pony trusses. One is the 125-foot swing truss and represents newer technology; the other is a 38-foot low/pony truss.

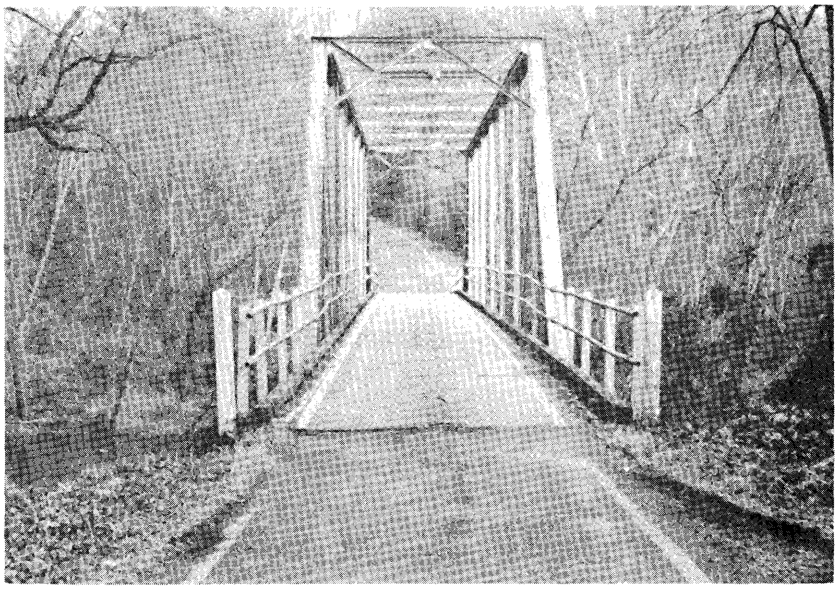


Figure 2. A typical high/through Pratt-type truss. (Caroline County; see form/photo number 06-16-1.)

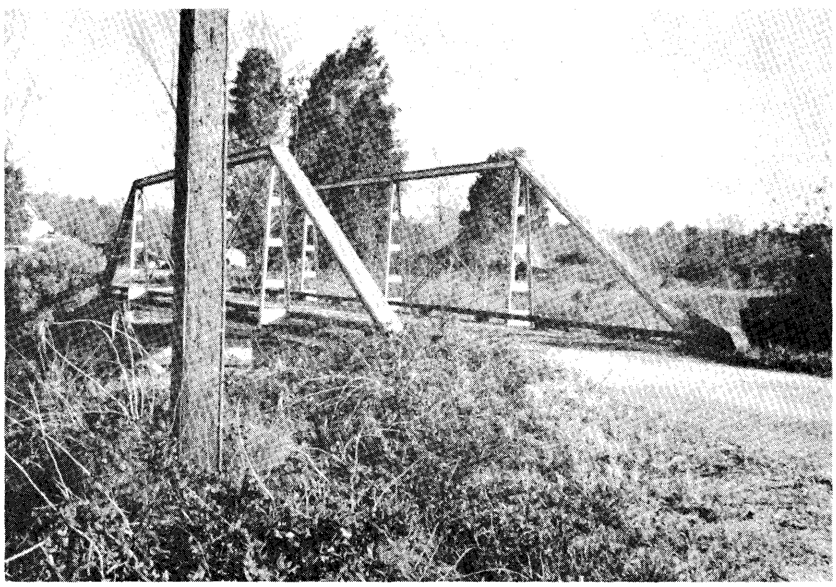


Figure 3. A typical low/pony Pratt-type truss with full sloped end posts/ batter braces. (Northumberland County; see form/photo number 06-66-1.)

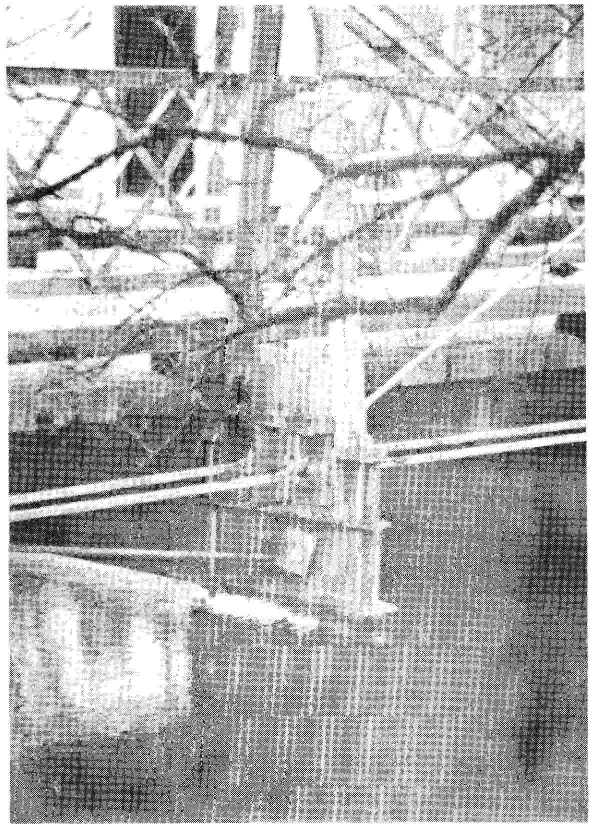


Figure 4. A pin connection used at the junction of an intermediate post, a lower chord member, a diagonal and a hanger beam. (King William County; see form/photo number 06-50-1.)

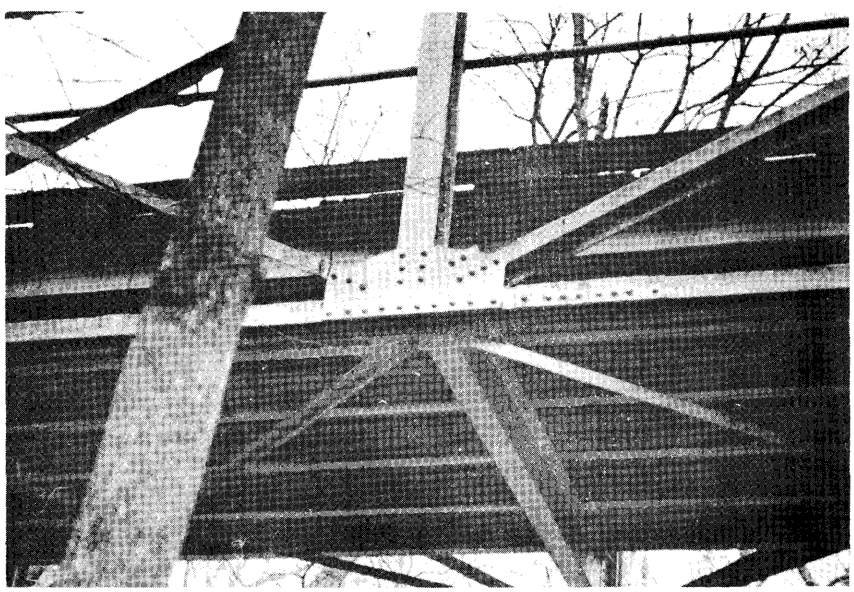


Figure 5. A riveted connection used at the junction of an intermediate post, a lower chord member, two diagonals and a hanger beam. (King William County; see form/photo number 06-50-2.)

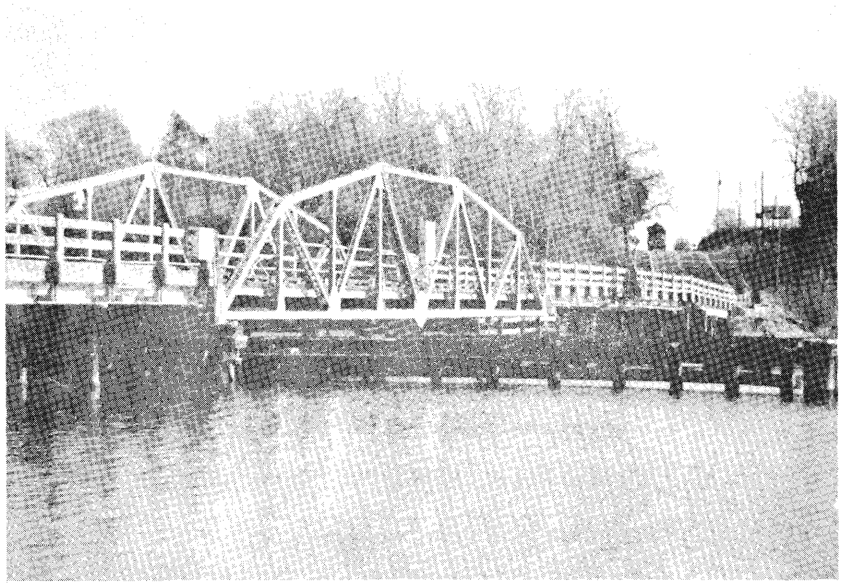


Figure 6. A low triangular truss with polygonal top chords. (Westmoreland County; see form/photo number 06-96-1.)

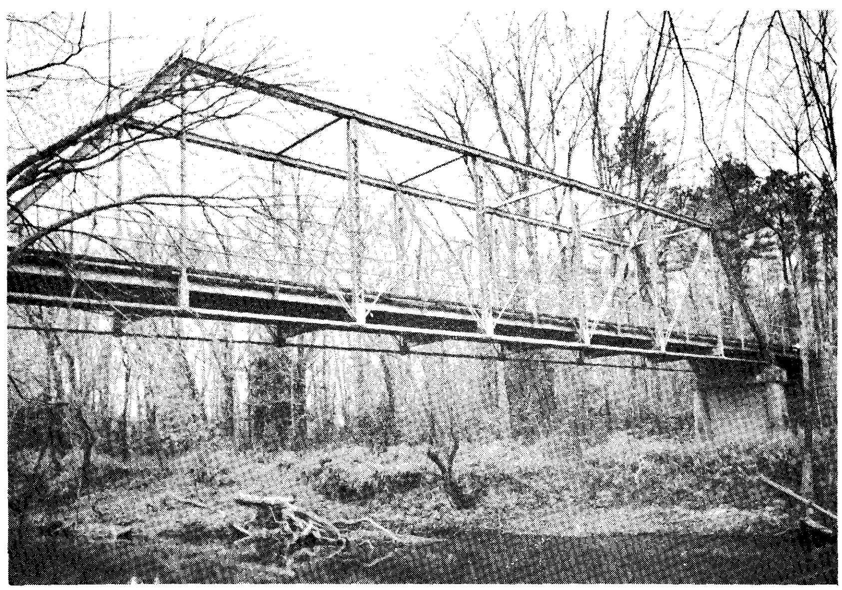
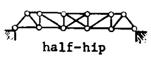
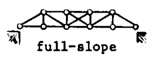
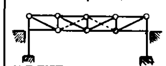
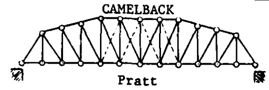
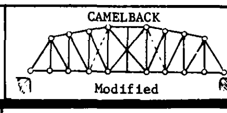


Figure 7. A high/through Pratt-type truss with horizontal top chords. (King William County; see form/photo number 06-50-2.)

Table 2. Bridge Dates, Connection Details and Truss Types in the Fredericksburg District.

TRUSS TYPE	LOW (Pony)					
	PRATT  half-hip	PRATT  full-slope	TRIANGULAR 	TRUSS LEG/BEDSTEAD 	CAMELBACK  Pratt	CAMELBACK  Modified
TRUSS DATES						
Known: 1870-1910: 1 1911-1932: 3		1 - 1910 1 - 1919	1 - 1927			
Unknown:		2 - ND				
CONNECTION DETAILS						
Pin with loop-welded eyebars:		2				
Pin with die-forged eyebars:		1				
Pin with combination eyebars:						
TOTAL		3				
Rigid Connected		1	1			

THROUGH (High)

ND - no date.
* - stylistic attribution.

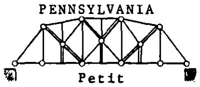
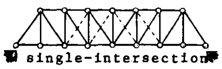
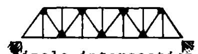
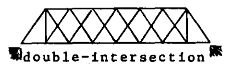
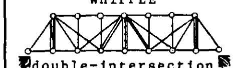
PENNSYLVANIA  Petit	PRATT  single-intersection	TRIANGULAR  single-intersection	TRIANGULAR  double-intersection	WHIPPLE  double-intersection	TOTAL
	1 - 1919				4
	1 - ND				3
	1 1 2				5
					2

Figure 8. A diagonal comprised of channels, cover plates with lacing bars on its underside while the top chord is comprised of channels and stay plates. (Westmoreland County; see form/photo number 06-96-1.)

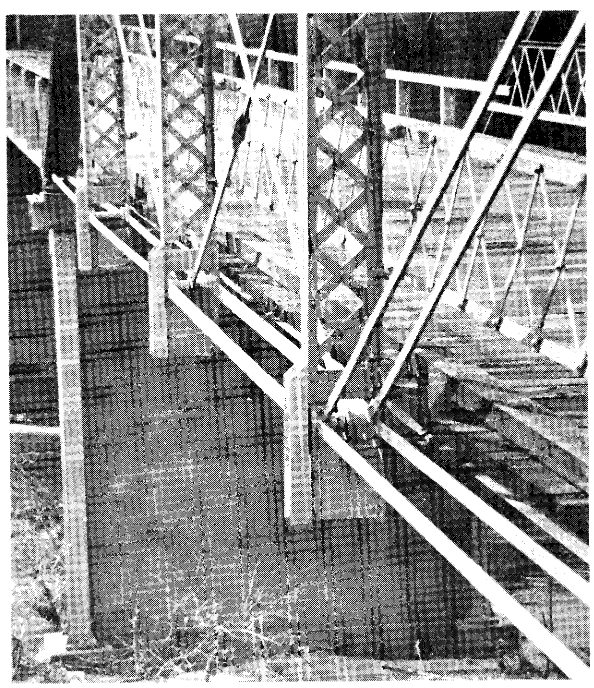


Figure 9. A post comprised of angles connected with latticing. (Spotsylvania; see form/photo number 06-88-1.)

Perhaps four of the trusses in the Fredericksburg District deserve special mention, though none of them can be thought of as structurally unique. The low, triangular swing truss is probably the oldest such type in Virginia, but its 1927 date places it well past the era of experimental truss technology. It was designed by the Virginia State Highway Commission and fabricated by the Roanoke Iron & Bridge Works, Roanoke, Virginia (see Appendix, Form 06-96-1). A two-span truss bridge, also designed by the State Highway Commission, was erected in 1919 by the Virginia Bridge & Iron Company of Roanoke (see Appendix, Form 06-50-2). It is on its original site and is one of the earliest intact examples of a State Highway Commission designed truss bridge. The oldest dated truss in the District was built in 1910 by the Roanoke Iron & Bridge Works. It is a rather short span at 38 feet, and according to departmental records was moved to this site from an unknown location in 1954 (see Appendix, Form 06-50-1).

The general paucity of bridges in the Fredericksburg District* is surprising, especially in view of the area's topography. Four major rivers, the Potomac, the Rappahannock, the Mattaponi, and the North Anna/Pamunkey/York system separate the District into two rather distinct peninsulas. Historically, these are known as the Northern Neck and the Pamunkey Neck. The early seventeenth century settlement and subsequent development paralleled the rivers, which were used as the major trade and transportation routes. The tobacco plantations were oriented toward the rivers and the product was shipped from the river ports — e.g., Port Royal, and Tappahannock, Falmouth, and West Point — to England. Only a limited number of "rolling" roads were needed to get the tobacco from the fields to the shipping points.[2] The rivers were therefore viewed as modes of commerce and not as impediments to development. The largely rural agrarian character of the area has allowed this tradition to continue, for even today the Potomac and Rappahannock Rivers are bridged at only a few places.

There is also little to say about the concentration of trusses (see Tables 4-8). King William County has three of the truss spans, but it is difficult to interpret this as a high concentration since two of them are incorporated in the same bridge. It crosses the Pamunkey/North Anna River as do two other truss spans. The remaining three are variously located in the District.

No county record research has been undertaken to determine the specific procedure followed for getting these company designed truss bridges built; however, from several other sources[3] a general understanding of the practice is apparent. The county officials, having

*373 maintained by the District Bridge Office.

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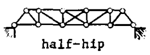
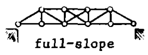
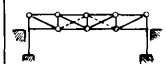
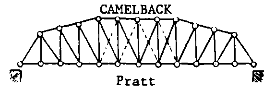
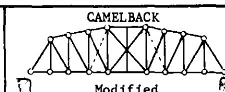
Table 3. Bridge Companies and Truss Types in the Fredericksburg District.

TRUSS TYPE / BRIDGE COMPANY	LOW (Pony)					
	PRATT  half-hip	PRATT  full-slope	TRIANGULAR 	TRUSS LEG/BEDSTEAD 	CAMELBACK  Pratt	CAMELBACK  Modified
ROANOKE IRON & BRIDGE WORKS Roanoke, Va.		1 - 1910 1 - ND	1 - 1927			
VIRGINIA BRIDGE & IRON COMPANY Roanoke, Va.		1 - 1919				
UNKNOWN		1 - ND				
TOTAL		4	1			

THROUGH (High)

ND - no date.
* - stylistic attribution.

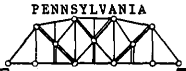
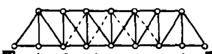
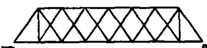
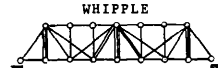
PENNSYLVANIA  Petit	PRATT  single-intersection	TRIANGULAR  single-intersection	TRIANGULAR  double-intersection	WHIPPLE  double-intersection	TOTAL
					3
	1 - 1919				2
	1 - ND				2
	2				7

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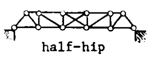
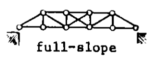
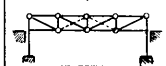
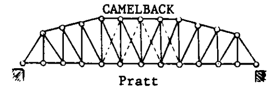
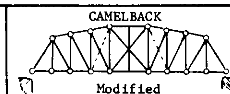
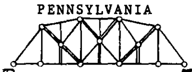
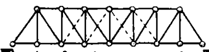
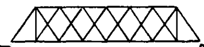
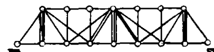
Table 4. Bridge Companies and Truss Types in Caroline County.

TRUSS TYPE / CAROLINE COUNTY	LOW (Pony)					
	PRATT  half-hip	PRATT  full-slope	TRIANGULAR 	TRUSS LEG/BEDSTEAD 	CAMELBACK  Pratt	CAMELBACK  Modified
UNKNOWN						
TOTAL						

THROUGH (High)

ND - no date.
* - stylistic attribution.

PENNSYLVANIA  Petit	PRATT  single-intersection	TRIANGULAR  single-intersection	TRIANGULAR  double-intersection	WHIPPLE  double-intersection	TOTAL
	1 - ND				1
	1				1

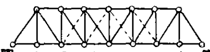
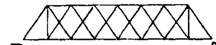
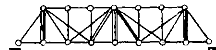
2626

Table 5. Bridge Companies and Truss Types in King William County.

KING WILLIAM COUNTY \ TRUSS TYPE	LOW (Pony)					
	PRATT half-hip	PRATT full-slope	TRIANGULAR	TRUSS LEG/BEDSTEAD	CAMELBACK Pratt	CAMELBACK Modified
ROANOKE IRON & BRIDGE WORKS Roanoke, Va.		1 - 1910				
VIRGINIA BRIDGE & IRON COMPANY Roanoke, Va.		1 - 1919				
TOTAL		2				

THROUGH (High)

ND - no date.
* - stylistic attribution.

PENNSYLVANIA  Petit	PRATT  single-intersection	TRIANGULAR  single-intersection	TRIANGULAR  double-intersection	WHIPPLE  double-intersection	TOTAL
					1
	1 - 1919				2
	1				3

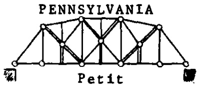
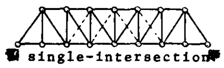
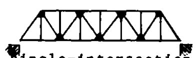
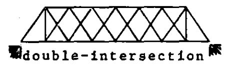
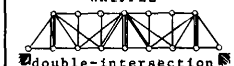
2628

Table 6. Bridge Companies and Truss Types in Northumberland County.

TRUSS TYPE / NORTH-UMBERLAND COUNTY	LOW (Pony)					
	PRATT half-hip	PRATT full-slope	TRIANGULAR	TRUSS LEG/BEDSTEAD	CAMELBACK Pratt	CAMELBACK Modified
ROANOKE IRON & BRIDGE WORKS Roanoke, Va.		1 - ND				
TOTAL		1				

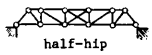
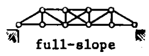
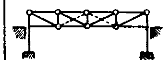
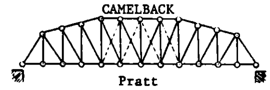
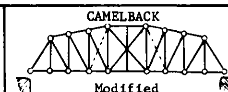
THROUGH (High)

ND - no date.
* - stylistic attribution.

PENNSYLVANIA  Petit	PRATT  single-intersection	TRIANGULAR  single-intersection	TRIANGULAR  double-intersection	WHIPPLE  double-intersection	TOTAL
					1
					1

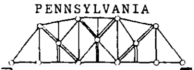
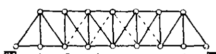
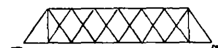
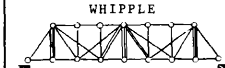
2830

Table 7. Bridge Companies and Truss Types in Spotsylvania County.

TRUSS TYPE / SPOTSYLVANIA COUNTY	LOW (Pony)					
	PRATT  half-hip	PRATT  full-slope	TRIANGULAR 	TRUSS LEG/BEDSTEAD 	CAMELBACK  Pratt	CAMELBACK  Modified
UNKNOWN		1 - ND				
TOTAL		1				

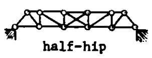
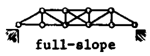
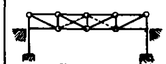
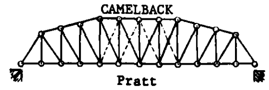
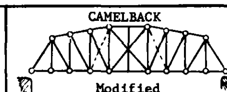
THROUGH (High)

ND - no date.
* - stylistic attribution.

PENNSYLVANIA  Petit	PRATT  single-intersection	TRIANGULAR  single-intersection	TRIANGULAR  double-intersection	WHIPPLE  double-intersection	TOTAL
					1
					1

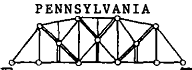
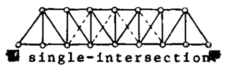
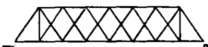
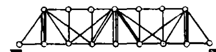
2632

Table 8. Bridge Companies and Truss Types in Westmoreland County.

TRUSS TYPE / WEST-MORELAND COUNTY	LOW (Pony)					
	PRATT  half-hip	PRATT  full-slope	TRIANGULAR 	TRUSS LEG/BEDSTEAD 	CAMELBACK  Pratt	CAMELBACK  Modified
ROANOKE IRON & BRIDGE WORKS Roanoke, Va.			1 - 1927			
TOTAL			1			

THROUGH (High)

ND - no date.
* - stylistic attribution.

PENNSYLVANIA  Petit	PRATT  single-intersection	TRIANGULAR  single-intersection	TRIANGULAR  double-intersection	WHIPPLE  double-intersection	TOTAL
					1
					1

decided where and when a bridge was needed, either as a replacement structure or as new construction, would draw up a notice of a "bridge-letting" and post it publicly or mail it to potential bidders, as well as publish it in newspapers or engineering journals.(4) (Figure 10.) The extent of the published specifications could vary significantly: one might be a highly detailed listing of dimensions, materials, loads (live and dead), flooring and abutment requirements; while another might be a relatively simple notice whose purpose was more a search for and discussion of what type bridge would be the best for the crossing.(5) Obviously, the experience and background of the local officials, along with their access to professional advice, would have determined the nature of a particular "bridge-letting". Waddell placed little faith in the ability of the typical local official to select the best bridge design from among the competitive bidders.(6) Even the most general comprehension of the variables in truss technology, e.g., number of panels vs. truss depth vs. span length vs. total weight vs. pin size vs. floor beam depth and weight, should indicate the formidable technological knowledge required in truss design. Most county officials were really at the mercy of the bridge companies and their representatives on whose integrity they were forced to rely. The bridge companies would respond to the "bridge-letting" notices either by sending bids and specifications along with their design for the commissioners to examine, or by having a company representative appear before the local officials to explain their proposals. The exact procedure would thus have depended on the preferences and policies of the individual counties.

It is not decisively clear if all "bridge-lettings" were based on the competitive bidding system. Public policy would certainly have dictated adhering to this system; however, on a local level there may have been factors of convenience or familiarity. After a county had contracted with a particular company, the immediate task of erecting the bridge was the responsibility of the erection foreman, a company employee who traveled from one bridge project to the next, hiring and training local labor for each job as well as securing needed supplies, e.g., timber for falsework and masonry and mortar for abutments.(7) Some of the materials might easily have been taken from the site — sand and gravel from the stream bed and rock and timber from the surrounding locale.(8) If everything went according to plan, this preliminary work was completed by the time the tools, equipment and truss components arrived at the nearest freight depot. The rapidity of the work depended on a number of other variables as well: weather, the site's location and accessibility, the water depth, the span length, and the truss type itself. Pin connected trusses were much faster and easier to erect than riveted connected ones, though with improvements in field riveting techniques, this advantage was

NOTICE

TO BRIDGE CONTRACTORS !

PROPOSALS will be received until the 16th day of April next, by the undersigned commissioners on the part of the counties of Orange and Culpeper, in the state of Virginia, for the Masonry and Construction of a **Wrought Iron Bridge,** about 167 feet span, across the Rapidan River, at Raccoon Ford.

The masonry required consists of two abutments, first-class rubble work of 20 feet face, with wings 20 feet and 8 feet thick, and to be founded on solid hard pan, or rock, below, and raised 15 feet above level of water when running over the entire length of the mill dam, to be laid of Syenite or solid hard stone in cement to water level, and with lime mortar above, and the bridge to be of ENTIRE WROUGHT IRON, floor excepted, which is to be of White Oak Plank, two and a-half inches thick, laid diagonally across, and with roadway twelve feet wide, the whole not to cost over FIVE THOUSAND DOLLARS, as limited by orders of the court.

Bids for entire work, or separately, for masonry and bridge, will be received, said proposals to be sent to office of the Clerk of the County Court of Culpeper County, in Culpeper, and are subject to the confirmation of the courts of the counties of Orange and Culpeper, and if any be accepted, and contract made, the work to be paid for out of the levies for the year 1883.

For any further information address Culpeper Commissioners at Raccoon Ford, Culpeper county, or Orange Commissioners at Rapidan Station, Culpeper county.

J. J. HALSEY,
H. T. HOLLADAY,
JAMES S. WILLIS,
Commissioners for Orange County.

W. S. STRINGFELLOW,
JNO. Z. HOLLADAY,
J. M. SCOTT,
Commissioners for Culpeper County.

Raccoon Ford, Va., March 21, 1883.

"TIMES" PRINT—CULPEPER.

Figure 10. A "bridge letting" notice put out in 1883 by the Boards of Supervisors of Culpeper and Orange Counties.

significantly reduced. Except for the connecting joints, virtually all riveting was machine-driven in the company's shop. Just as a truss is built up from component parts, i.e., posts, chord sections, eye bars and rods, so, too, are these members fabricated from standardized steel or wrought iron shapes, e.g., channels, angles, bars and plates. These basic shapes were machine sized, cut, drilled, punched, and riveted into the various truss components at a bridge company's fabrication shop, and were subsequently put together at the site simply by slipping pins in at the various panel points. Field riveting was thus kept to a minimum.

When the job was completed, the erection crew was disbanded and the foreman moved on to the next project or returned to the company's home or regional office. In some counties where many more bridges were needed and trusses built, a pool of trained laborers would have developed over a period of years from which the companies could have drawn; however, the area comprising the Fredericksburg District was not one of those. The economy was agriculturally based and the life-style, tending toward self-sufficiency, was slow paced and locally oriented. Except for seasonal peaks, general transportation requirements would have been low. Consequently, the metal truss bridge form, as one symbol of expanding industrial technology, was hardly evident in the nineteenth century rural landscape of the present-day Fredericksburg Construction District.

NOTES

1. James A. L. Waddell, The Designing of Ordinary Iron Highway Bridges, New York, John Wiley & Sons, Inc., 1891 (fifth edition), pp. IX-X.

2. See Thomas H. Warner, History of Old Rappahannock County Virginia, 1656-1692, Pauline Pearce Warner, Tappahannock, Virginia, 1965, p. 156.

3. See David H. Miars, A Century of Bridges, Wilmington (Ohio), 1972, pp. 23-25; and Waddell, op. cit., p. 157-171.

4. Waddell, op. cit., p. 157.

5. Ibid.

6. Ibid., pp. 157-171.

7. Miars, op. cit., p. 24.

8. Ibid.

2838

APPENDIX

METAL TRUSS BRIDGES IN THE FREDERICKSBURG DISTRICT OF SPECIAL INTEREST

2640

R-358

Photo Numbers: 06-50-2

A E
B F
C G
D H

R-2,12402:1-16

TRUSS BRIDGE SURVEY AND INVENTORY FORM

Geographic Information

State: Virginia
Va. Dept. of Highways District: Fredericksburg; No. 06.
County: King William (Hanover); No. 50.
~~City~~/Town: Nelson's Bridge.
~~Street~~/Road: State Route 615.
River/~~Stream/Railroad~~ (crossing): Pamunkey River.
UTM/KGS Coordinates: ________.

Historical Information

Formal designation: ________.
Local designation: #6906 (District Structure No.); Nelson's Bridge
Designer: Virginia State Highway Commission, Richmond, Virginia.
Builder: Virginia Bridge & Iron Company, Roanoke, Virginia.
Date: 1919; basis for: Bridge/date plate.
Original owner: Hanover & King William Counties; use: Vehicular bridge.
Present owner: Va. Dept. of Highways & Transp.; use: Vehicular bridge.

Historical or Technological Significance

____ Unique/Unusual in its time: ________.

X Rare survivor though of standard design: A fairly early State Highway Commission design truss though of no real technological value.

____ Typical example of its time and a common survivor: ________.

____ Other Remarks/Explanation: These truss spans were built on this site together, i.e., conceived of as one design.
Built from the Commission's standard plans: L-B-1
Site plan IX-25 date from 15 February 1919 LL-3
L-30

Nature/Degree of any destructive threats: Bid notices for replacing this bridge were advertised in July 1974.

Reference materials and contemporary photos/illustrations with their respective locations:
BRIDGE SAFETY INSPECTION FILE, District Bridge Office
PLANS: IX-25, 15 February 1919
L-B-1
LL-3
L-30

Recorder: DAN DEIBLER.
Date: 25 November 1974.
Affiliation: Research Council
Concrete Section.

2642

Design Information

Compass orientation of axis: *N/S*.

No. of spans: ______; length; overall: *256'*.

Span types:

(1) *Steel beam*; length: *21'2"*.
(2) *Steel beam*; length: *21'8"*.
(3) *Low truss*; length: *71'4"*.
(4) *Thru/truss*; length: *120'4"*.
(5) *Steel beam*; length: *21'8"*.
(6) ______; length: ______.

No. of lanes: *1*; width: *13'6"* c to c.

Architectural or decorative features:

Simple 2-pipe railing.

Lateral struts are back-to-back angles joined with a continuous plate.

Structural Information

Substructure:

Material: *Concrete*.
Foundations: ______.
Piers: *Concrete*.
Abutments: *Concrete*.
Wings: *Concrete*.
Seats: *Concrete*.

Superstructure:

Material: *Steel* sources *Bethlehem*.

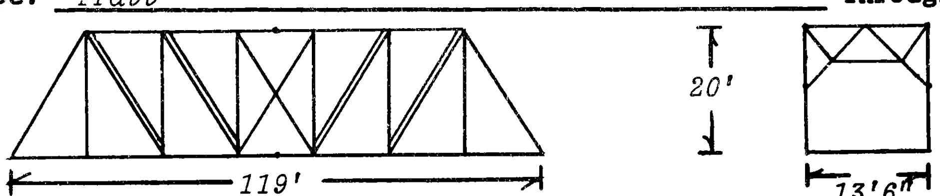
Characteristics, details and members:

Connections: *X* pin.
______ rigid.

Top Chords *2 upright channels connected with lacing bars top and bottom*.
End Posts: *2 upright channels connected with lacing bars top and bottom*.
Bottom chords: *Double rectilinear eyebars, die forged*.
Posts: *2 upright channels connected with lacing bars paralleling roadway*.
Diagonals: *Double rectilinear eyebars, die forged*.
Counters: *Single rectilinear eyebars, die forged*.

Truss Configuration

Main span type: *Pratt* Through/[redacted]



7 panels @ 17' each

Secondary span type: ______ Through/Pony/Deck, Skew

Design Information

Compass orientation of axis: _______.

No. of spans: _______; length; overall: _______

Span types:

(1) ______________; length: __________

(2) ______________; length: __________

(3) ______________; length: __________

(4) ______________; length: __________

(5) ______________; length: __________

(6) ______________; length: __________

No. of lanes: _______; width: _______ c to c.

Architectural or decorative features:

Structural Information

Substructure:

Material: ____________________.

Foundations: ____________________.

Piers: ____________________.

Abutments: ____________________.

Wings: ____________________.

Seats: ____________________.

Superstructure:

Material: *Steel* sources *Eastern, U.S.A.*.

Characteristics, details and members:

Connections: ______ pin.

X rigid.

Top Chords *2 upright channels connected with lacing bars top and bottom*.

End Posts: *2 upright channels connected with lacing bars top and bottom*.

Bottom chords: *Double angles connected with stay plates*.

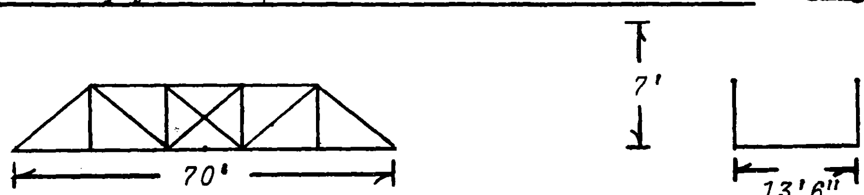
Posts: *Paired, back-to-back angles connected with continuous plates*.

Diagonals: *Double angles connected with stay plates*.

Counters: *Single angles connected at intersection*.

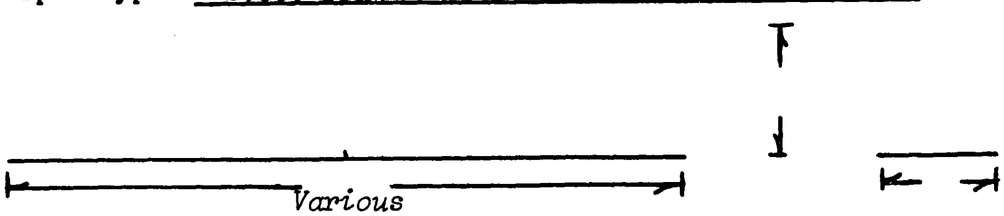
Truss Configuration

Main span type: *Pratt, full slope* [redacted]/Pony/[redacted]



5 panels @ 14' each

Secondary span type: *Steel beam* [redacted]/Deck, [redacted]



2644

R-358

TRUSS BRIDGE SURVEY AND INVENTORY FORM

Photo Numbers: *06-50-1*

_*A*
_*B*
_*C*
_*D*

R-2, 12402:17-21

Geographic Information

State: Virginia
Va. Dept. of Highways District: *Fredericksburg*; No. *06*.
County: *King William*; No. *50*.
[redacted]/Town: *Mitchell's Mill*.
[redacted]/Road: *State Route 610*.
[redacted]/Stream/[redacted] (crossing): *Dam spillway*.
UTM/KGS Coordinates: ____.

Historical Information

Formal designation: ____.
Local designation: *#6009 (District Structure No.)*.
Designer: ____.
Builder: *Roanoke Iron & Bridge Works, Roanoke, Virginia*.
Date: *1910*; basis for: *Bridge/date plate*.
Original owner: ____; use: *Vehicular bridge*.
Present owner: *Va. Dept. of Highways & Transp.*; use: *Vehicular bridge*.

Historical or Technological Significance

____ Unique/Unusual in its time: ____.

____ Rare survivor though of standard design: ____.

X Typical example of its time and a common survivor: ____.

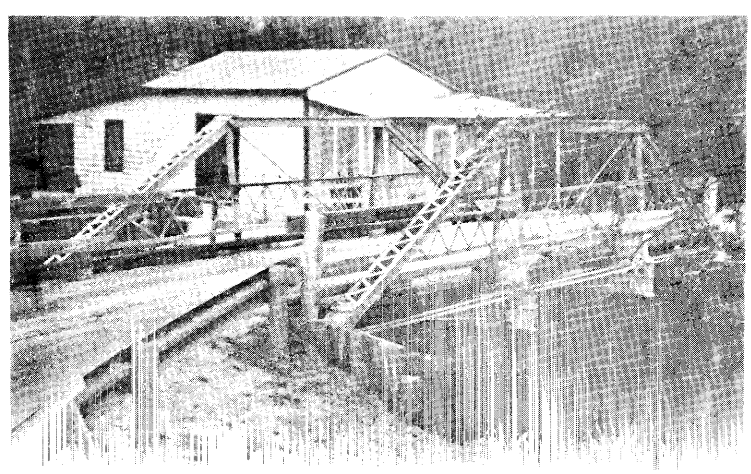
____ Other Remarks/Explanation: *There are no bolts at panel points to suggest that this truss bridge had been relocated to this site; however, the bridge's report file indicates that it was moved to this site in 1954 and re-erected by state forces.*

A report comment: "This bridge has problems."

Nature/Degree of any destructive threats: ____.

Reference materials and contemporary photos/illustrations with their respective location

BRIDGE SAFETY INSPECTION FILES, District Bridge Office



Recorder: *DAN DEIBLER*.
Date: *25 November 1974*.
Affiliation: *Research Council*
Concrete Section.

Design Information

Compass orientation of axis: *NW/SE*.

No. of spans: *1*; length; overall: *40'3"*.

Span types:

(1) *Truss*; length: *38'3"*.
(2) ______; length: ______.
(3) ______; length: ______.
(4) ______; length: ______.
(5) ______; length: ______.
(6) ______; length: ______.

No. of lanes: *1*; width: *13'6"* c to c.

Architectural or decorative features:

Widely spaced lacing bars.

Has Roanoke Iron & Bridge characteristic "A-frame" configured posts.

Structural Information

Substructure:

Material: *Concrete*.
Foundations: ______.
Piers: ______.
Abutments: *Concrete*.
Wings: *Concrete*.
Seats: *Concrete*.

Superstructure:

Material: *Steel* sources *Cambria*.

Characteristics, details and members:

Connections: *X* pin.
______ rigid.

Top Chords *2 upright channels connected with lacing bars top and bottom*.
End Posts: *2 upright channels connected with lacing bars top and bottom*.
Bottom chords: *Double rectilinear eyebars, loop welded*.
Posts: *Paired back-to-back angles connected with stay plates; "A" configuration*.
Diagonals: ______.
Counters: *Single rectilinear tie rods, loop welded*.

Truss Configuration

Main span type: *Pratt, full slope* [redacted]/Pony/[redacted]

3 panels @ 12'9" each

Secondary span type: ______ Through/Pony/Deck, Skew

2646

R-358

Photo Numbers: 06-96-1

__A
__B
__C

R-1,12402:7A-20A

TRUSS BRIDGE SURVEY AND INVENTORY FORM

Geographic Information

State: Virginia

Va. Dept. of Highways District: Fredericksburg; No. 06.

County: Westmoreland; No. 96.

[redacted]/Town: Mt. Holly.

[redacted]/Road: State Route 202.

[redacted]/Stream/[redacted] (crossing): Nomini Creek.

UTM/KGS Coordinates: ______.

Historical Information

Formal designation: ______.

Local designation: #1004 (District Structure No.) Nomini Ferry Bridge

Designer: Virginia State Highway Commission, Richmond, Virginia.

Builder: Roanoke Iron & Bridge Works, Inc., Roanoke, Virginia.

Date: 1927; basis for: Date/bridge plate.

Original owner: Virginia State Highway Commission; use: Vehicular bridge.

Present owner: Va. Dept. of Highways & Transp.; use: Vehicular bridge.

Historical or Technological Significance

X Unique/Unusual in its time: To date this is the only swing truss-span bridge seen in Virginia.

___ Rare survivor though of standard design: ______.

___ Typical example of its time and a common survivor: ______.

___ Other Remarks/Explanation: Approach spans were lengthened in 1948 and 1966.

Nature/Degree of any destructive threats: ______.

Reference materials and contemporary photos/illustrations with their respective locatior

BRIDGE SAFETY INSPECTION FILE, District Bridge Office.

PLANS: XXX-11A (August 1926), B,C,D, XCVII-5.

Recorder: DAN DEIBLER.

Date: 9 December 1974.

Affiliation: Research Council, Concrete Section.

Design Information

Compass orientation of axis: *E/W*.

No. of spans: *Multi*; **length; overall:** *557'*.

Span types:

(1) *Steel beam*; **length:** *75'6-1/2"*.
(2) *Steel beam (6)*; **length:** *120'*.
(3) *Truss*; **length:** *125'*.
(4) *Steel beam (6)*; **length:** *120'*.
(5) *Steel beam*; **length:** *111'1-1/2"*.
(6) ____; **length:** ____.

No. of lanes: *2*; **width:** *25'4-1/2"* **c to c.**

Architectural or decorative features:

Simple 2-pipe railing.

**Center panel utilizes*

Structural Information

Substructure:

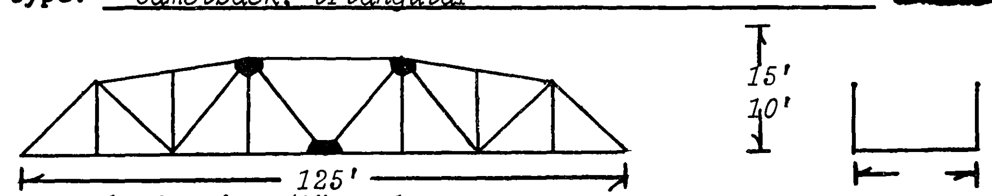
Material: *Steel, wood*.
Foundations: ____.
Piers: *Wood pilings*.
Abutments: *Concrete*.
Wings: *Concrete*.
Seats: *Concrete*.

Superstructure:

Material: *Steel* **sources** *Bethlehem*.
Characteristics, details and members:
Connections: ____ **pin.**
X **rigid.**
* **Top Chords** *2 upright channels connected with lacing bars top and bottom*.
End Posts: *2 upright channels connected with lacing bars top and bottom*.
Bottom chords: *2 upright channels connected with lacing bars top and bottom*.
Posts: *Paired back-to-back angles connected with continuous plates*.
Diagonals: *2 upright channels connected w/cover plate (middle) and lacing bars*.
Counters: *Paired back-to-back angles connected with continuous plates*.

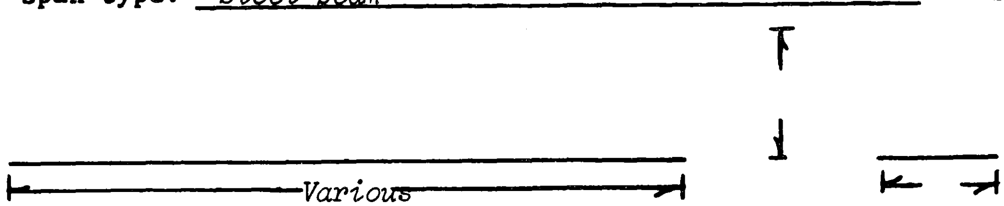
Truss Configuration

Main span type: *Camelback, triangular* [redacted]/**Pony**/[redacted]



8 panels @ 15'7-1/2" each

Secondary span type: *Steel beam* [redacted]/**Deck,** [redacted]



2848