

United States Department of the Interior
National Park Service

National Register of Historic Places
Inventory—Nomination Form

For NPS use only
received JAN 24 1983
date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Creamery Bridge (Rainbow)

and/or common Creamery Bridge

2. Location

street & number FAS 456 north city limits of Osawatomie n/a not for publication

city, town Osawatomie n/a vicinity of congressional district

state Kansas code 20 county Miami code 121

3. Classification

Category	Ownership	Status	Present Use
<input type="checkbox"/> district	<input checked="" type="checkbox"/> public	<input checked="" type="checkbox"/> occupied	<input type="checkbox"/> agriculture <input type="checkbox"/> museum
<input type="checkbox"/> building(s)	<input type="checkbox"/> private	<input type="checkbox"/> unoccupied	<input type="checkbox"/> commercial <input type="checkbox"/> park
<input checked="" type="checkbox"/> structure	<input type="checkbox"/> both	<input type="checkbox"/> work in progress	<input type="checkbox"/> educational <input type="checkbox"/> private residence
<input type="checkbox"/> site	Public Acquisition	Accessible	<input type="checkbox"/> entertainment <input type="checkbox"/> religious
<input type="checkbox"/> object	<input type="checkbox"/> in process	<input type="checkbox"/> yes: restricted	<input type="checkbox"/> government <input type="checkbox"/> scientific
	<input type="checkbox"/> being considered	<input checked="" type="checkbox"/> yes: unrestricted	<input type="checkbox"/> industrial <input checked="" type="checkbox"/> transportation
	n/a	<input type="checkbox"/> no	<input type="checkbox"/> military <input type="checkbox"/> other:

4. Owner of Property

name Miami County

street & number Courthouse

city, town Paola n/a vicinity of state Kansas

5. Location of Legal Description

courthouse, registry of deeds, etc. Register of Deeds

street & number Miami County Courthouse

city, town Paola state Kansas

6. Representation in Existing Surveys

title Inventory of Marsh Arch Bridges--
Kansas Department of Transportation has this property been determined eligible? yes no

date 1980 federal state county local

depository for survey records Kansas State Historical Society

city, town Topeka state Kansas

7. Description

Condition		Check one	Check one
<input checked="" type="checkbox"/> excellent	<input type="checkbox"/> deteriorated	<input type="checkbox"/> unaltered	<input checked="" type="checkbox"/> original site
<input checked="" type="checkbox"/> good	<input type="checkbox"/> ruins	<input checked="" type="checkbox"/> altered	<input type="checkbox"/> moved date _____
<input type="checkbox"/> fair	<input type="checkbox"/> unexposed		

Describe the present and original (if known) physical appearance

The Creamery bridge in Osawatomie, Kansas spans the Marais Des Cygnes river on FAS 456. The structure is composed of a central 140 foot "rainbow arch" (or "Marsh arch") span with an 80 foot rainbow arch span on each end.

With piers and approach decks the total length is 346 feet 6 inches.

The bridge's piers rest on solid rock approximately 50 feet below grade. Its abutments rest approximately 15 feet below grade on creosoted piles. Low water level is 36 feet below grade.

The best description of a rainbow arch span is contained in James Marsh's 1911 patent application. The bridge consists of ". . . two abutments (which could be piers), a pair of arches disposed between and springing from the abutments, the floor carried by and between the arches and reaching from one abutment to the other where it alines with the parapets or rails along opposite sides of the floor line." The original patents called for slideable wear plates to be moulded into the concrete where the bridge floor came into contact with the beams and abutments. This is of importance as one of the main benefits of this design was to allow for the expansion and contraction of the reinforced concrete bridge under varying conditions of temperature and moisture.

There were two basic rainbow arch designs, fixed and tied. The original patent application describes the fixed type such as the Creamery bridge in which case the arch flowed below the bridge deck and was "fixed" directly into the abutment. This massive abutment (or pier) resisted both the horizontal and the vertical thrust of the arch. In a tied design the arch did not flow below the deck line and was not fixed directly into the abutment. It was secured atop the abutment or pier by the use of steel rocker or expansion rocker bearings. Vertical thrust was resisted by the pier and bearing, while horizontal thrust was resisted by the addition of a lower chord.

The Creamery bridge's 20 foot wide roadway has been resurfaced periodically but this has not significantly compromised its integrity. Marsh's plans allowed for whatever filling material, between the bridge deck curbs, that locality might desire. The bridge's light fixtures (two on each approach and one on each overhead thru strut) are no longer in operation.

8. Significance

Period	Areas of Significance—Check and justify below			
<input type="checkbox"/> prehistoric	<input type="checkbox"/> archeology-prehistoric	<input type="checkbox"/> community planning	<input type="checkbox"/> landscape architecture	<input type="checkbox"/> religion
<input type="checkbox"/> 1400–1499	<input type="checkbox"/> archeology-historic	<input type="checkbox"/> conservation	<input type="checkbox"/> law	<input type="checkbox"/> science
<input type="checkbox"/> 1500–1599	<input type="checkbox"/> agriculture	<input type="checkbox"/> economics	<input type="checkbox"/> literature	<input type="checkbox"/> sculpture
<input type="checkbox"/> 1600–1699	<input type="checkbox"/> architecture	<input type="checkbox"/> education	<input type="checkbox"/> military	<input type="checkbox"/> social/ humanitarian
<input type="checkbox"/> 1700–1799	<input type="checkbox"/> art	<input checked="" type="checkbox"/> engineering	<input type="checkbox"/> music	<input type="checkbox"/> theater
<input type="checkbox"/> 1800–1899	<input type="checkbox"/> commerce	<input type="checkbox"/> exploration/settlement	<input type="checkbox"/> philosophy	<input type="checkbox"/> transportation
<input checked="" type="checkbox"/> 1900–	<input type="checkbox"/> communications	<input type="checkbox"/> industry	<input type="checkbox"/> politics/government	<input checked="" type="checkbox"/> other (specify)
		<input type="checkbox"/> invention		

Specific dates 1931

Builder/Architect

James B. Marsh, Engineer

Statement of Significance (in one paragraph)

The Creamery "rainbow arch" (or "Marsh arch") bridge in Osawatomie retains its integrity of location, design, setting, materials, feeling, and association. It is associated with the life of James B. Marsh, pioneer in steel and concrete bridge construction. The bridge embodies the distinctive characteristics of a type and method of construction that is no longer used, and, as such may yield information important to the history of engineering. Although 72 rainbow arches are currently known to exist in Kansas they are quickly becoming a thing of the past due to the ever-changing needs of modern transportation. Of these 72, only eight have three spans.

James Barney Marsh was born in 1856 at North Lake, Wisconsin. He went to Iowa at the age of 18 to enter preparatory school at Fredericksburg. Marsh graduated in 1882 from Iowa State College of Agriculture and Mechanical Arts in Ames, with a B.M.E. degree. In March of 1883 he began his professional career in the Des Moines office of the King Bridge Company of Cleveland, Ohio. With King, Marsh was involved in the design, sales and actual erection of metal bridges. While he continued to work with the King Company, he also became head of the Northern Agency for the Kansas City Bridge and Iron Company. In this capacity, he both designed and superintended the actual construction work done by the company. By March of 1889, Marsh had become general western agent and contracting engineer for the King Bridge Company and was placed in charge of the general western office in Des Moines. In the spring of 1896, he formed his own company, the Marsh Bridge Company, and was its sole proprietor. In private practice as a contracting engineer, Marsh was able to more fully develop his own designs. He also constructed the designs he developed, usually using steel as a medium. At the turn of the century, Marsh initiated the use of both concrete and steel in his bridge design. In April of 1904, the Marsh Bridge Company was incorporated with Marsh as president and chief engineer. In 1909, the company was reorganized as the Marsh Engineering Company.

It was not until the introduction of the "rainbow arch" by Marsh, that Kansas made widespread use of reinforced concrete spans for major stream crossings. Marsh canvassed the midwest, selling his arches in direct competition with the steel trusses at that time.

On December 12, 1930 the Osawatomie Graphic reported that the town was to have a new bridge. The contract for a rainbow arch bridge over the Marais Des Cygnes had been let to the Maxwell Construction Company on December 8, 1930 for a bid of \$36,087.84. The existing bridge had been condemned several times.

The last mention of the bridge was in the May 21, 1931 issue of the Graphic when county engineer Harold J. Abbey predicted seven more working days were needed to complete the structure.

9. Major Bibliographical References

See Continuation Sheet, Item #9.

10. Geographical Data

Acreage of nominated property .5

Quadrangle name Paola West

Quadrangle scale 1:24,000

UMT References

A

1	15	3	2	9	5	3	0	4	2	6	3	2	3	0
Zone		Easting				Northing								

B

Zone		Easting				Northing								

C

Zone		Easting				Northing								

D

Zone		Easting				Northing								

E

Zone		Easting				Northing								

F

Zone		Easting				Northing								

G

Zone		Easting				Northing								

H

Zone		Easting				Northing								

Verbal boundary description and justification

That property on and over which the bridge is built in Osawatomie, Kansas. S10, T18S, R22E. Includes bridge superstructure plus supporting piers and abutments.

List all states and counties for properties overlapping state or county boundaries

state	n/a	code	county	code

state	code	county	code

11. Form Prepared By

name/title Larry Jochims, Research Historian and Michael Snell

organization Kansas State Historical Society date 7/22/82

street & number 10th and Jackson Streets telephone (913) 296-2973

city or town Topeka state Kansas

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

national state local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature 

title Executive Director, Ks. State Historical Society date January 4, 1983

For NPS use only

I hereby certify that this property is included in the National Register

date

Keeper of the National Register

Attest:

date

Chief of Registration

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

FOR NPS USE ONLY

RECEIVED

DATE ENTERED

**NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM**

CONTINUATION SHEET

ITEM NUMBER 9

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9. Bibliography

"To Have New Bridge," Osawatomie Graphic, December 12, 1930, p. 1, c. 2.

"New Water Mains Are Ready For Use," Osawatomie Graphic, January 4, 1931, p. 3, c. 2.

"To Finish New Bridge Soon," Osawatomie Graphic, May 21, 1931, p. 1, c. 5.

Nichols, C.S., Comp. Directory of Graduates of Division of Engineering, Iowa State College of Agriculture and Mechanical Arts, Ames, Iowa.

The Alumnus of Iowa State. Alumni Association of Iowa State College, Ames, Volume XXXII, #1, July 1936.

Marsh, James B., Specification of Letters Patent, Number 1,035,026, patented August 6, 1912, United States Patent Office, Washington, D.C.

Plans and files. Design Department, Kansas Department of Transportation, Topeka, Kansas Microfilm Roll #29, frame #359+.