NPS Form 10-900
(7-81)

OMB NO. 1024-0018
EXP. 12/31/84

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 Conroe Bridge (Rainbow Arch

and/or common Clark's Creek Bridge

2. Location

street & number ~~East Northeast~~ of E Junction City n/a **not for publication**

city, town Junction City vicinity x **vicinity of** ~~congressional district~~

state Kansas **code** 20 **county** Geary **code** 61

3. Classification

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

4. Owner of Property

name Geary County

street & number Courthouse

city, town Junction City n/a **vicinity of** **state** Kansas

5. Location of Legal Description

courthouse, registry of deeds, etc. Register of Deeds

street & number Geary County Courthouse

city, town Junction City **state** Kansas

6. Representation in Existing Surveys

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

date 1980 ___ federal x state ___ county ___ local

depository for survey records Kansas State Historical Society

city, town Topeka **state** Kansas

7. Description

Condition		Check one	Check one
___ excellent	___ deteriorated	___ unaltered	_x_ original site
_x_ good	___ ruins	_x_ altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

The Conroe bridge crosses Clark's Creek approximately 5 miles east-northeast of Junction City on a county road. It is a single span "rainbow arch" (or "Marsh arch") measuring 100 feet in length. Its 20 foot wide roadway has been resurfaced periodically but this has not significantly compromised the bridge's integrity. Marsh's plans called for whatever filling material, between the bridge deck curbs, that locality might desire.

The bridge's abutments rest approximately 30 feet below grade and the low water level lies approximately 25 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 Conroe 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.

8. Significance

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

Specific dates 1925 **Builder/Architect** James B. Marsh, Engineer

Statement of Significance (in one paragraph)

The Conroe "rainbow arch" (or "Marsh arch") bridge east-northeast of Junction City, Kansas 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 arch bridges are currently known to exist in Kansas the ever-changing needs of modern transportation have made them an endangered species.

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.

The contract for the construction of the Conroe bridge was let to Fred Luttjohann of Topeka on December 16, 1924 for a bid of $17,291.60. Luttjohann was also awarded the contract for another rainbow arch over Lyons creek and work began on this structure almost immediately.

By August 13, 1925 the Lyons creek bridge had been completed and Luttjohann had begun excavation work on the Conroe bridge.

The Junction City Weekly Union reported on December 10, 1925 that only a little concrete work remained to be done on the structure. Work was to proceed during the cold weather by using hot sand and hot water to mix the concrete. The slab could then be kept warm by lighted lanterns covered with tarpaulins.

The Weekly Union reported the bridge's completion on December 24, 1925.

9. Major Bibliographical References

See Continuation Sheet, Item #9.

10. Geographical Data

Acreage of nominated property .5

Quadrangle name Ogden **Quadrangle scale** 1:24,000

UMT References

	Zone	Easting	Northing		Zone	Easting	Northing
A	14	691631610	4132144151 0	B			
C				D			
E				F			
G				H			

Verbal boundary description and justification

That property on and over which the bridge is built northeast of Junction City, Kansas. S35, T11S, R6E. Includes bridge superstructure plus supporting 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 x 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 Jerry A. Siddall

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

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

9. Bibliography

"Open Bids on December 16," Junction City Daily Union, November 12, 1924, p. 1, c. 1.

"Let Contracts for Road Work," Junction City Daily Union, December 16, 1924, p. 1, c. 1.

"Open Bids on Federal Aid Road," Junction City Daily Union, December 18, 1924, p. 1, c. 3.

"Is a Fine Bridge," Junction City Weekly Union, June 4, 1925, p. 1, c. 3.

"State Accepts Bridges," Junction City Weekly Union, August 13, 1925, p. 1, c. 4.

"Busy at Conroe Bridge," Junction City Weekly Union, September 10, 1925, p. 1, c. 1.

"At Work on New Bridge," Junction City Weekly Union, September 17, 1925, p. 1, c. 2.

"Much Work on County Roads," Junction City Daily Union, September 25, 1925, p. 1, c. 1.

"Clark's Creek Bridge," Junction City Weekly Union, December 10, 1925, p. 1, c. 7.

"Geary's Vast Road System," Junction City Weekly Union, December 24, 1925, p. 1, c. 3.

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 #140, frame #36+.