NPS Form 10-900
(7-81)

OMB No. 10024-0018
Exp. 12/31/84

United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

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

For NPS use only
received
date entered

1. Name

historic Cottonwood River Bridge

and/or common Cottonwood River Bridge

2. Location

street & number .12 miles west of Marion, Kansas on Vine Street N/A not for publication

city, town Marion x vicinity of [redacted]

state Kansas code 20 county Marion code 115

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 State of Kansas, Department of Transportation

street & number State Office Building

city, town Topeka N/A vicinity of state Kansas

5. Location of Legal Description

courthouse, registry of deeds, etc. Register of Deeds

street & number Marion County Courthouse

city, town Marion 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	_x_ deteriorated	___ unaltered	_x_ original site
___ good	___ ruins	_x_ altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

The Cottonwood River bridge on Vine street just west of Marion, Kansas is a 120 foot long "rainbow arch" (or "Marsh arch"). The reinforced concrete has begun to deteriorate and new railings have been installed on the structure. The 20 foot wide roadway has been resurfaced periodically but this does not significantly compromise the bridge's integrity as Marsh's plans allowed for whatever filling material, between the bridge deck curbs, that locality might desire. The light fixture on the overhead thru strut has also been altered.

The bridge's abutments rest on a bed of solid rock approximately 27 feet below grade. The low water level is 21 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 Cottonwood River 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	___ theater	
___ 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	x transportation	
x 1900–	___ communications	___ industry	___ politics/government	___ other (specify)	
		___ invention			

Specific dates 1923 **Builder/Architect** James B. Marsh, Engineer

Statement of Significance (in one paragraph)

The Cottonwood River "rainbow arch" (or "Marsh arch") bridge west of Marion, 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 arches are known to exist in Kansas, they are quickly becoming out-dated by the needs of modern transportation. The Cottonwood River bridge, however, has a good chance for survival due to its location.

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 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 Marion Record on July 5, 1923 announced that the city and county commisioners had let the bid for the construction of the Cottonwood River bridge to the Yancey Construction Company for a bid of $21,085.81. The bridge was to be constructed to the north of an existing bridge as part of a paving project.

The newspapers make no more mention of the bridge until its opening on December 1, 1923. The Marion Review of December 4, 1923 reported that the assistant state engineer proclaimed in "one of the finest in the state." The structure's final cost was $22,500.00.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

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DATE ENTERED

Bibliography

"Notice to Road Contractors," Marion Review, June 19, 1923, p. 7, c. 2.

"Road Bids Let," Marion Record, July 5, 1923, p. 1, c. 6.

"City Makes Showing in Improvements," Marion Review, September 4, 1923, p. 1, c. 5.

"New Bridge Opened," Marion Review, December 4, 1923, p. 5, c. 4.

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 #142, frame #116+.

9. Major Bibliographical References

See Continuation Sheet, Item #9.

10. Geographical Data

Acreage of nominated property .5

Quadrangle name Marion

Quadrangle scale 1:24,000

UMT References

	Zone	Easting	Northing
A	14	671900	4246180
B			
C			
D			
E			
F			
G			
H			

Verbal boundary description and justification

That property on and over which the bridge is built .12 miles west of Marion, Kansas. S6, T205, R4E. 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

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

title date

For NPS use only

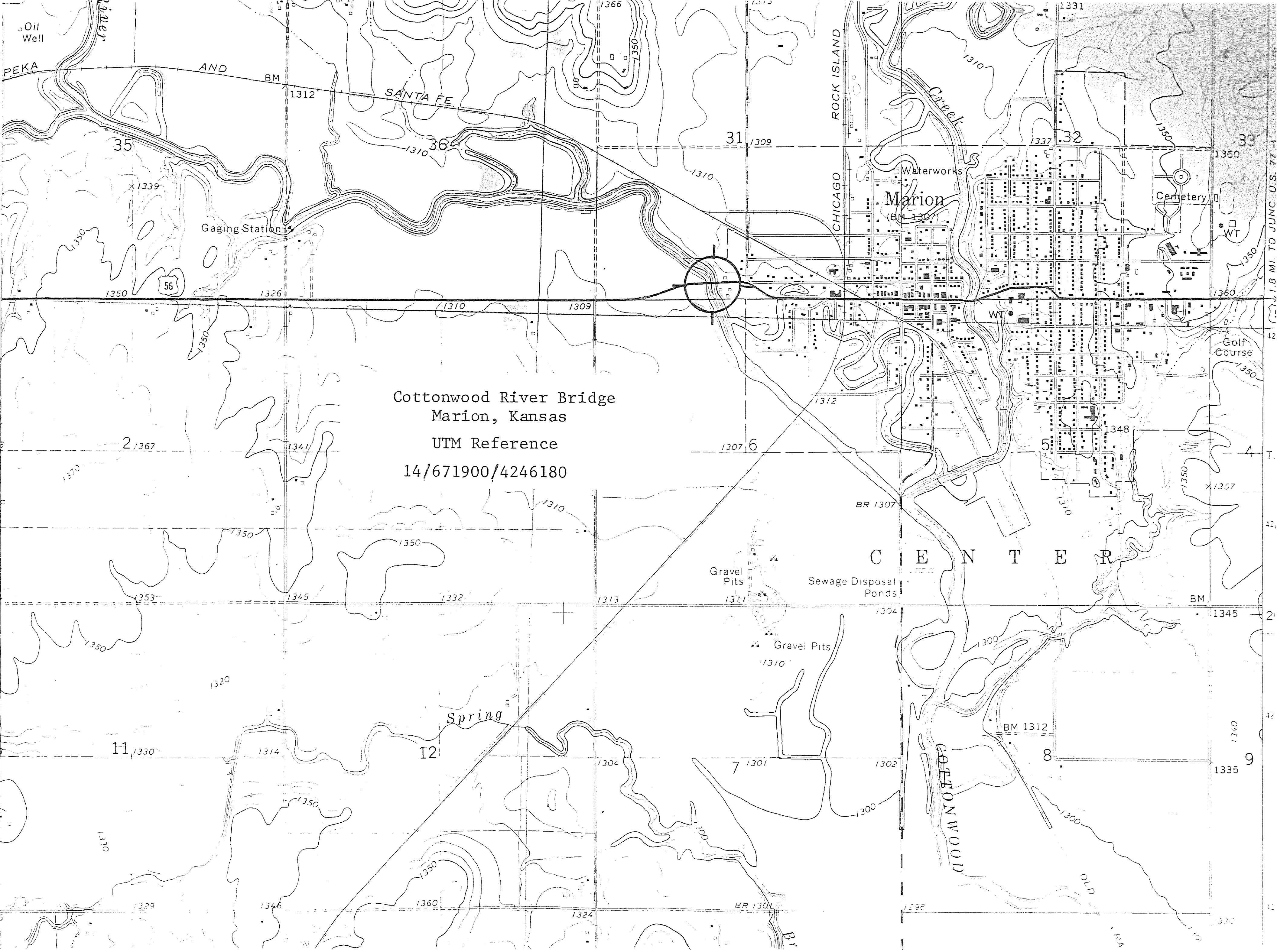
I hereby certify that this property is included in the National Register

date

Keeper of the National Register

Attest: date

Chief of Registration

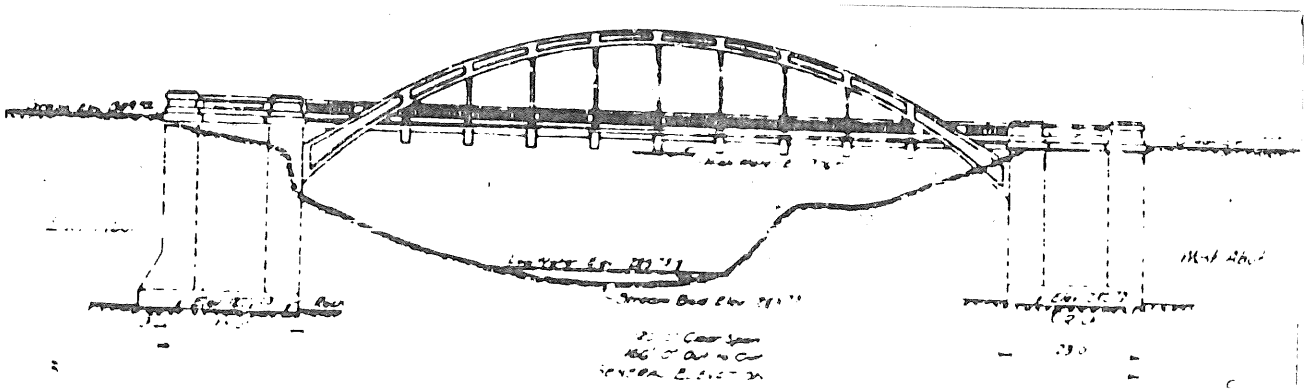


Cottonwood River Bridge
Marion, Kansas

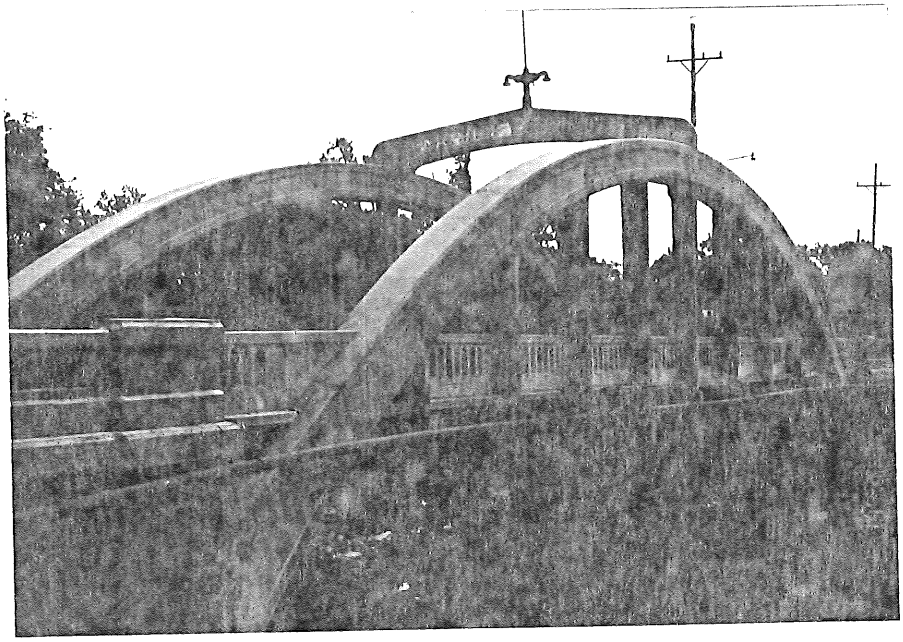
UTM Reference

14/671900/4246180

The following photographs were taken by Larry Jochims and Michael Snell at Marion, Kansas. Photograph negatives are located at the Kansas State Historical Society, Topeka, Kansas.

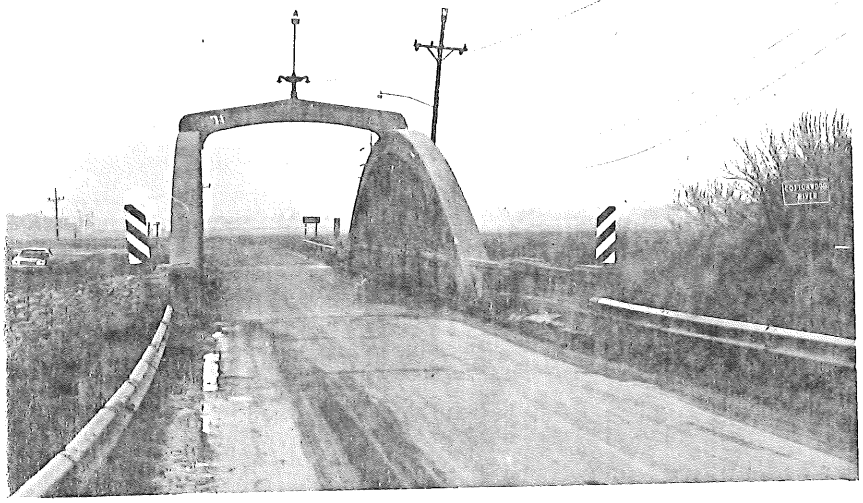


Cottonwood River Bridge from original plans.



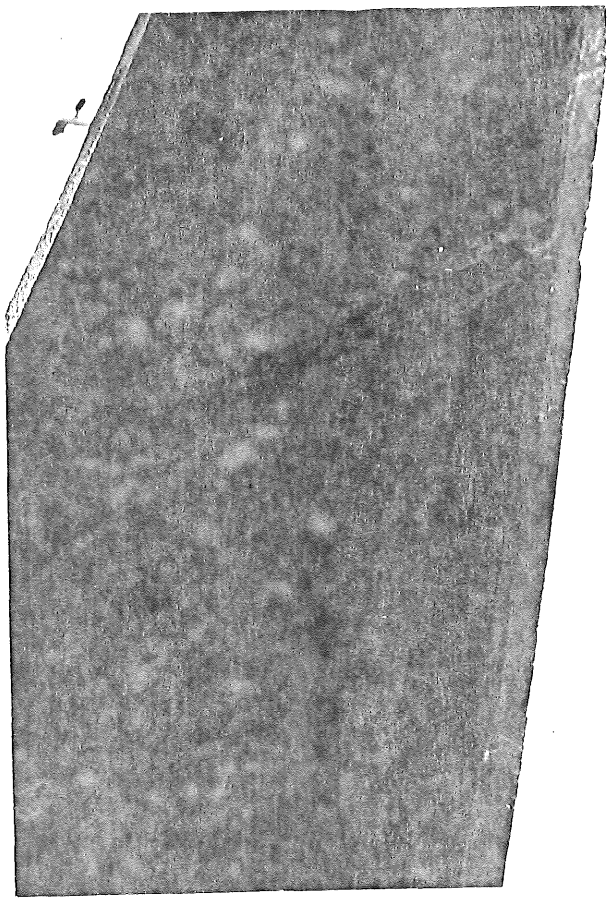
Cottonwood River Bridge South side looking northeast.

Photograph taken on June 25, 1982.



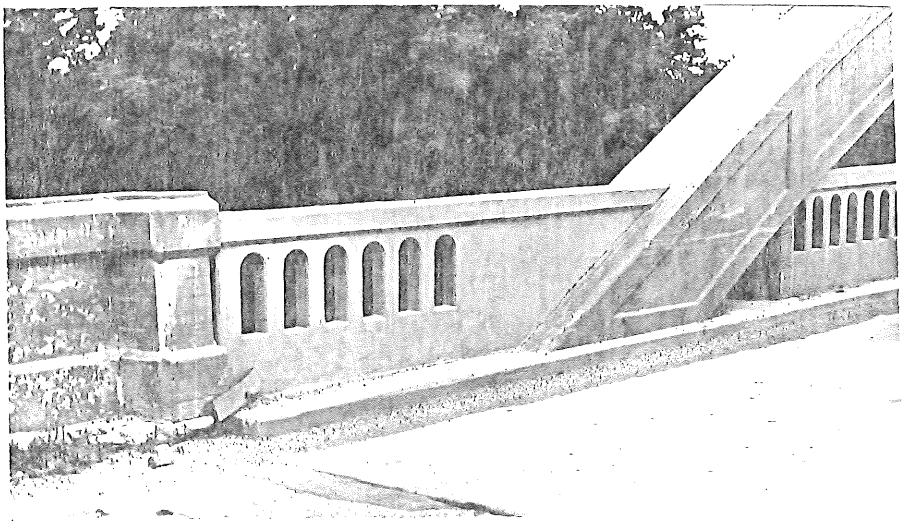
Cottonwood River Bridge East arch looking west. Photograph taken on March 16, 1982.

Cottonwood River Bridge West arch looking east. Photograph taken on March 16, 1982.

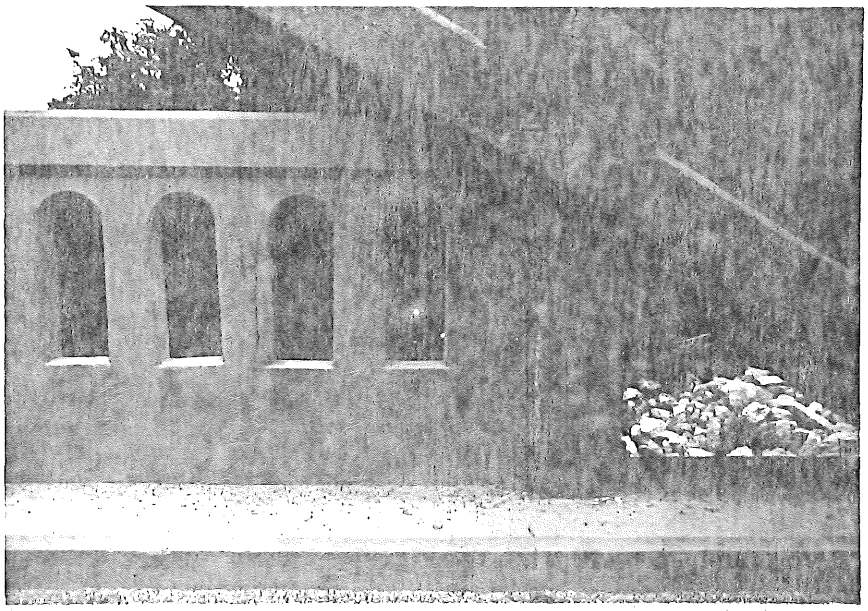


Cottonwood
River Bridge
Detail of
damage to
underside of
north arch.

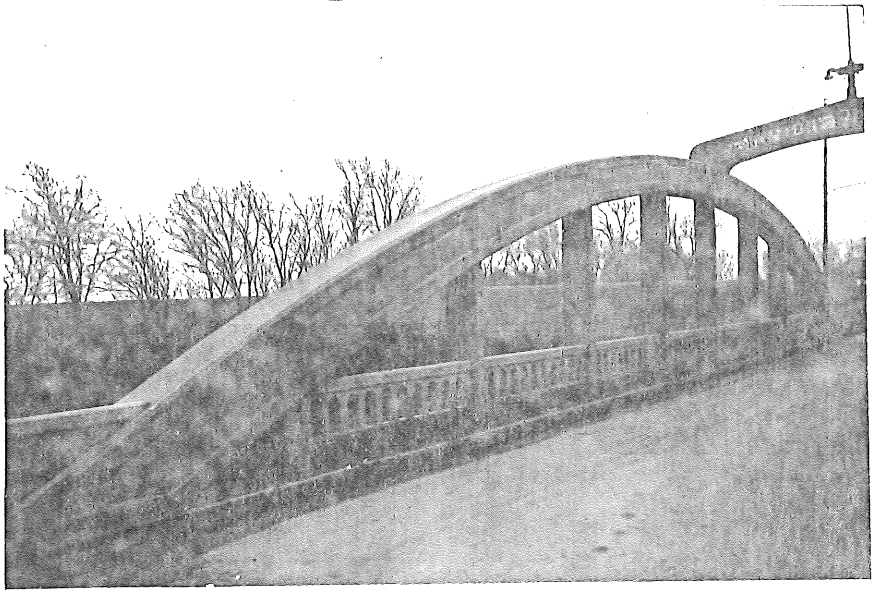
Photographs taken
on June 25, 1982



Cottonwood
River Bridge
South railing
east end.

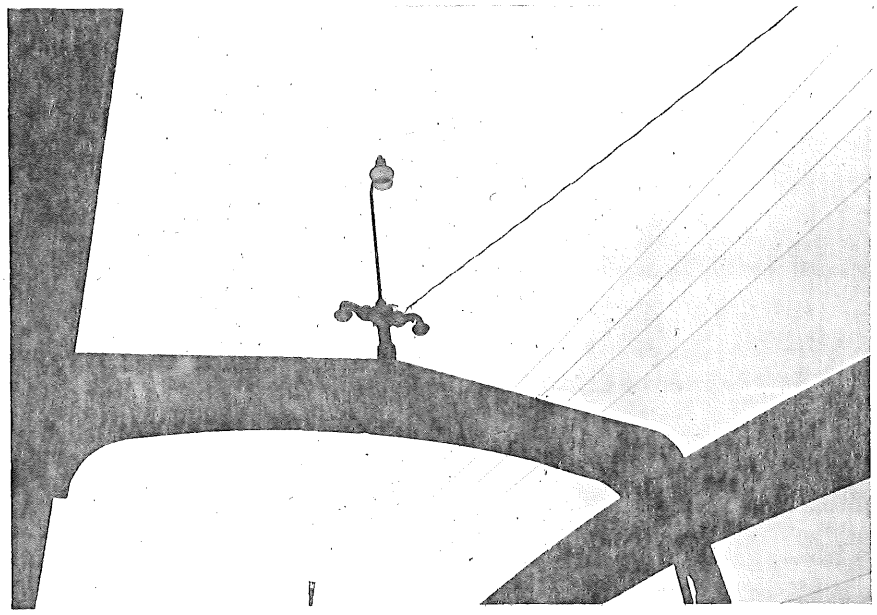


Cottonwood
River Bridge
Railing detail.



Cottonwood River Bridge North arch looking northeast.

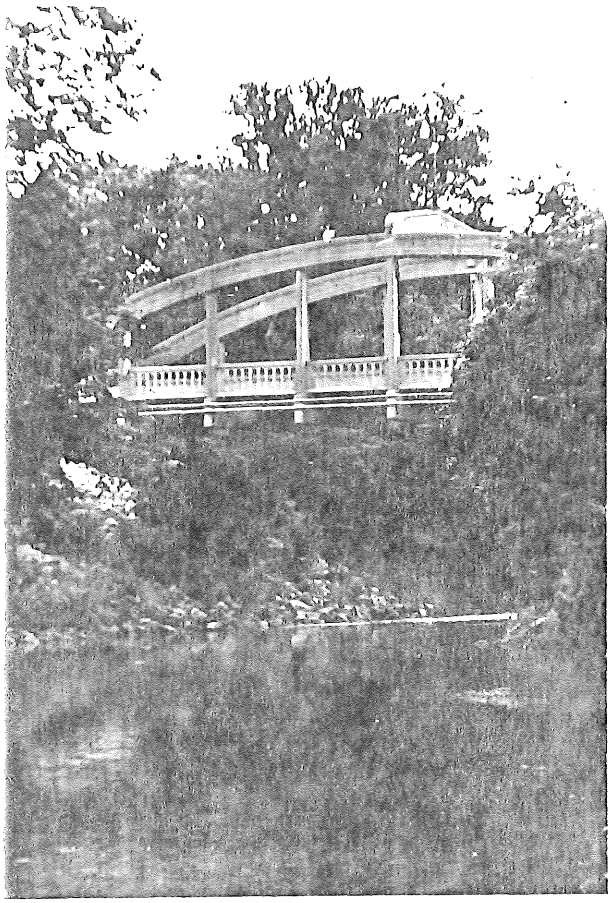
Cottonwood River Bridge South arch looking southwest.



Cottonwood River Bridge light fixture.

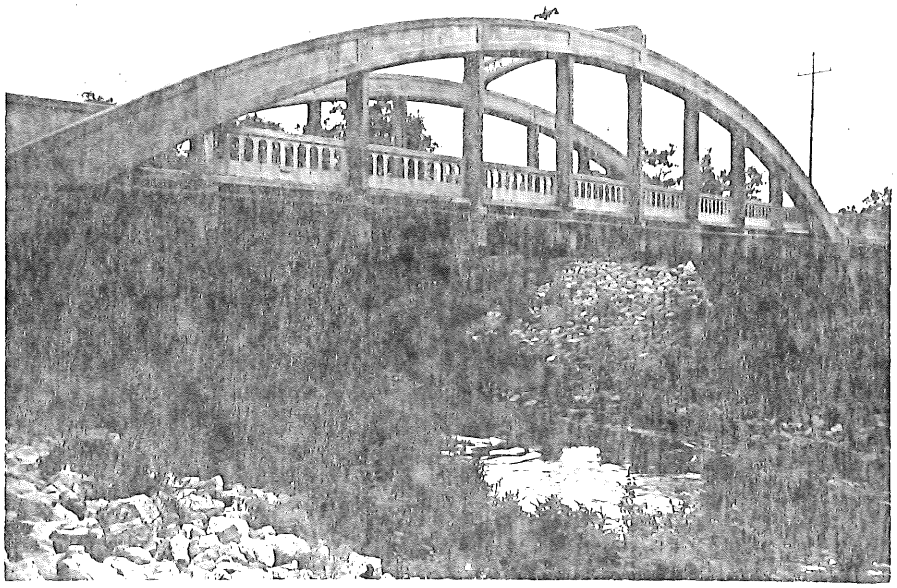
Photographs taken on March 16, 1982

Cottonwood
River Bridge
South side
looking
northeast.



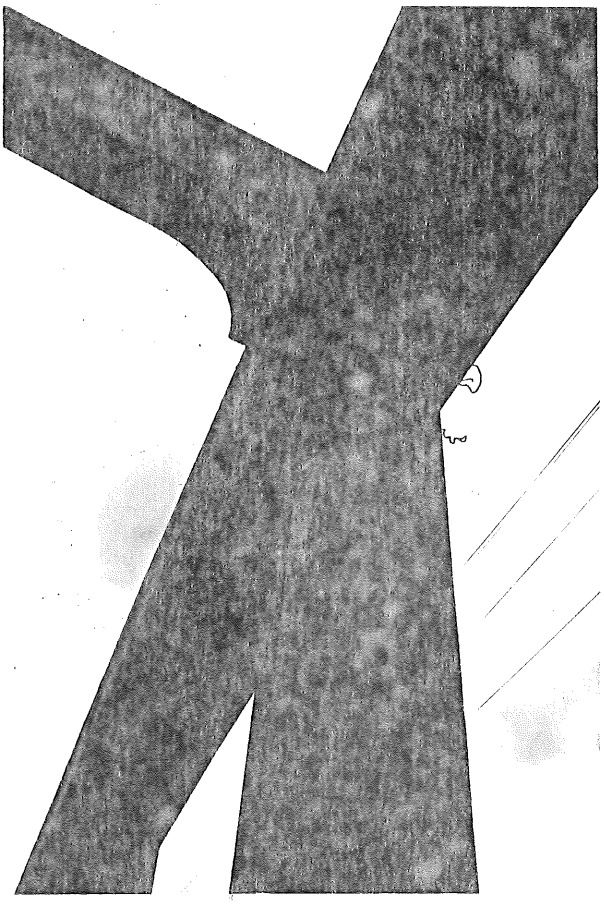
Cottonwood
River Bridge
North side
looking south.

Photographs taken
on June 25, 1982

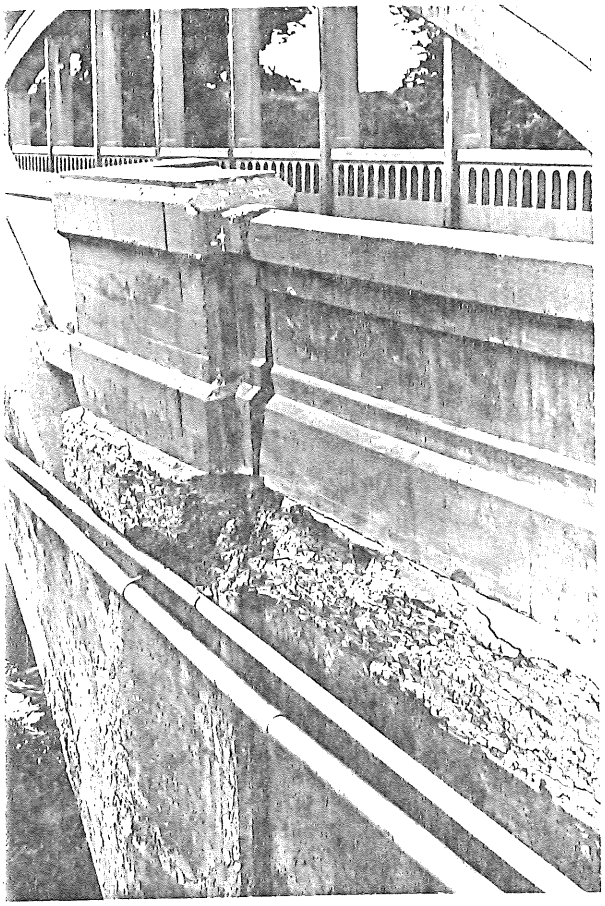


Cottonwood
River Bridge
South side
looking
northeast.

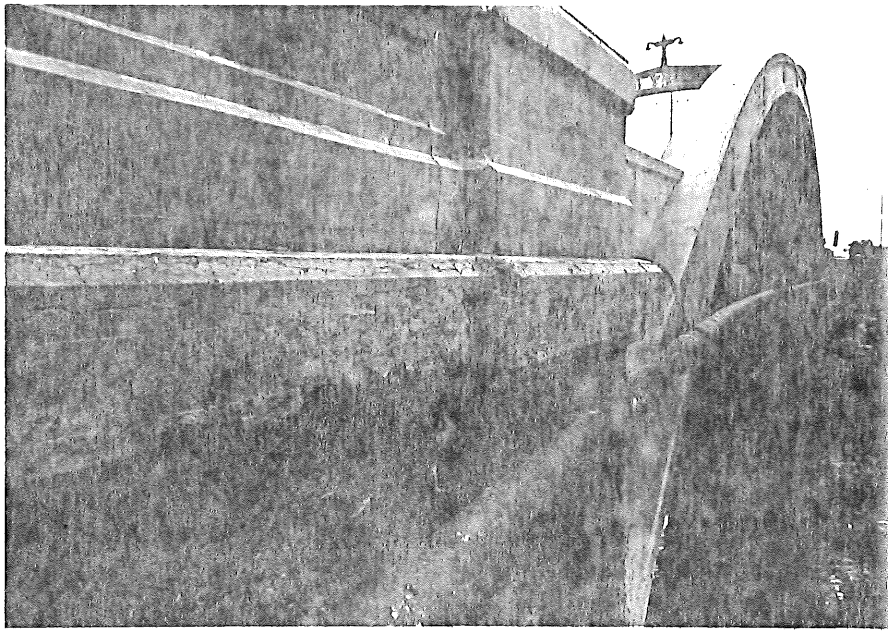
Cottonwood River Bridge Detail of damage on north hangar.



Photographs taken on June 25, 1982



Cottonwood River Bridge North side of the west end showing spalling of concrete.



Cottonwood River Bridge South side of the west end showing spalling of concrete.

DESCRIPTION

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.

DESCRIPTION INSERT 2

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SIGNIFICANCE Insert I

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BIBLIOGRAPHY INSERT

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

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Plans and files. Design Department, Kansas Department of Transportation, Topeka, Kansas Microfilm ~~Roll #9, frame 2902~~ Roll #142, frame 116+.