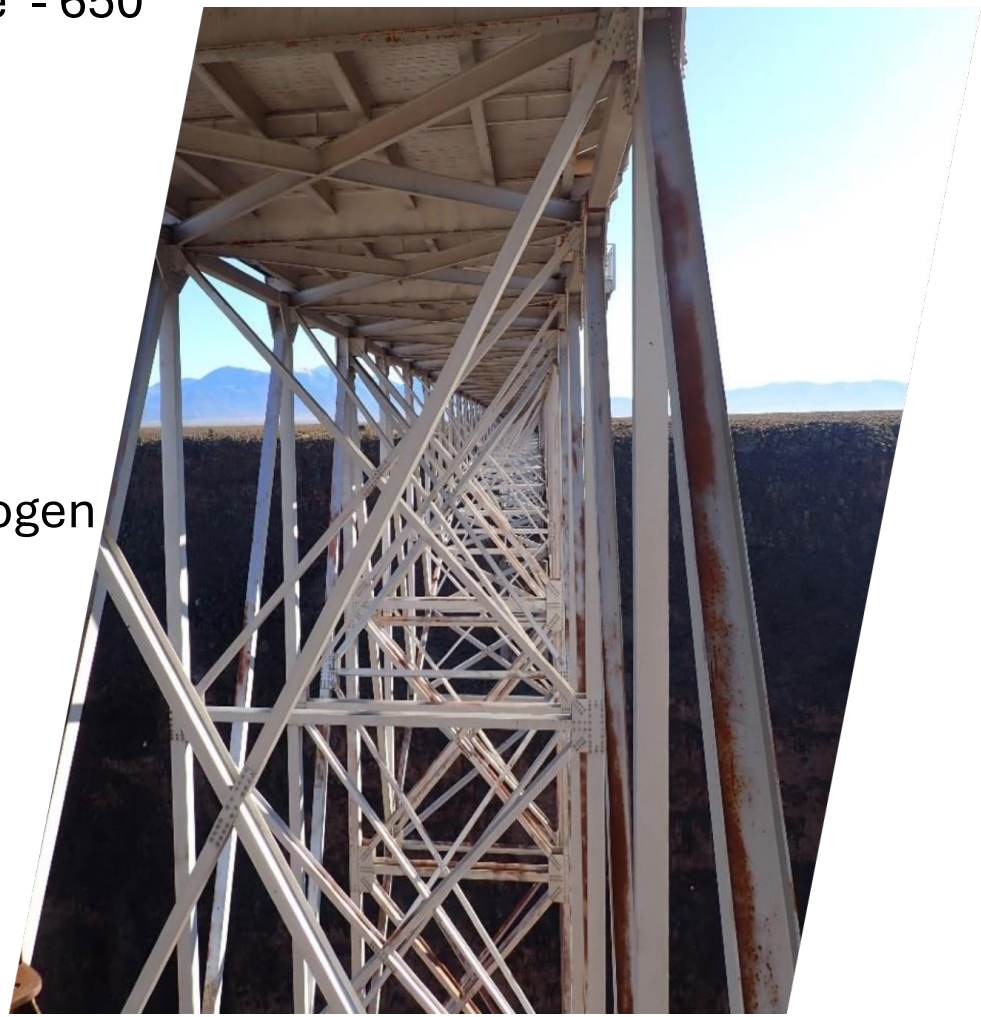
Rio Grande Gorge Bridge

NMDOT

Rio Grande Gorge Bridge

- Designed : In-house
- Constructed : 1964 to 1965 (about 60 years old). Cost = $2,153,000
- Continuous Steel Deck Truss (300’, 600’, 300”). Rio Grande Gorge - 650’ deep and 1200’ wide.
- Combination of built-up steel box members and rolled I beams

- T1-Steel
  - High strength steel – AASHTO M244 Grade 100
  - Welded joints in tension susceptible to cracking due to hydrogen contamination / hydrogen embrittlement



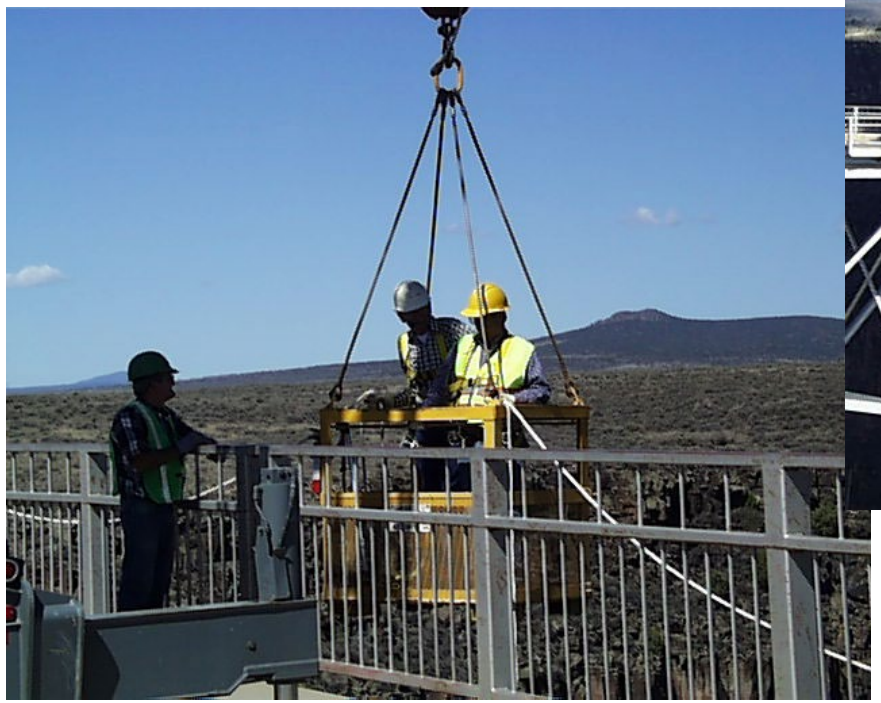
1964 Newspaper Article – T1-Steel

RIO GRANDE GORGE BRIDGE

Courtesy of the New Mexico State Highway Department, Santa Fe, New Mexico 87501
Downstream or South Elevation of the bridge showing the 650-foot deep gorge

The bridge, on New Mexico Route 111, is approximately 10 miles northwest of Taos in Taos County, New Mexico. Because of terrain and severe weather conditions in this region, it was designed for high strength and performance for an above normal wind velocity of 90 miles per hour. Charles E. Reed, Bridge Engineer, ~~of the Bridge Design Section of~~ the New Mexico State Highway Department, said, "Of course we could have obtained the same performance from other steels besides "T-1" but not as economically. We estimate the State Highway Department will save about $175,000 with the use of "T-1" steel compared to A36 carbon steel". Truss members are welded box sections with high strength bolt connections. The design live load was H20-S16-44 in accordance with the "Standard Specifications for Highway Bridges" by the American Association of State Highway Officials. The truss members are 32 feet center to center and 100 feet deep at the main piers and 20 feet deep at the ends and midspan. The superstructure slab, 36'-3" wide out to out, supports a 28-foot roadway and two 4-foot sidewalks. Observation platforms, 15'-1" by 4'-0" in plan, were built on both sides at midspan and above the main piers. The panel spacing is 30 feet throughout the entire length of the trusses. The sketch below appeared in "Quenched and Tempered Alloy Steels in Bridge Design", April 1964; Courtesy of USS Steel Corporation.

- Inspected by NMSU from 1970’s through 2010
- Combination of climbing, snooper and crane/basket



Currently inspected by consultant.

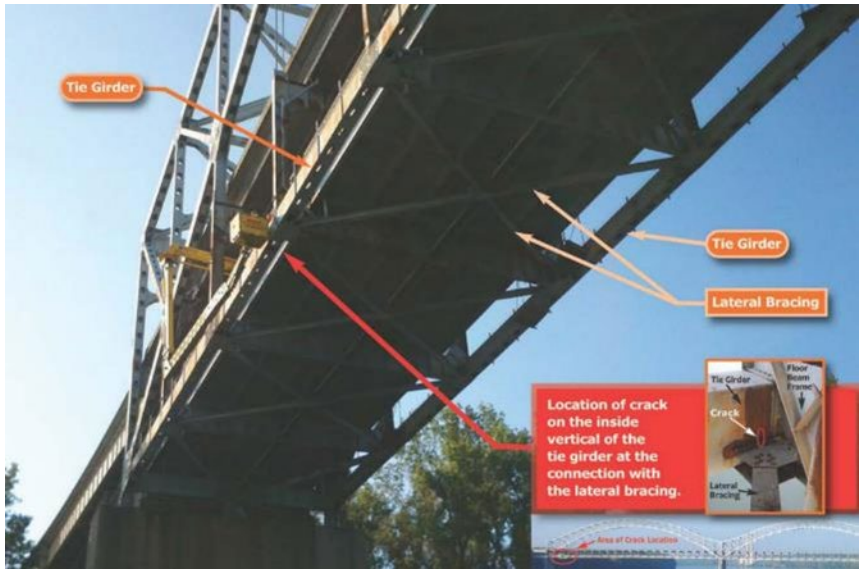
U.S. Department of Transportation
Federal Highway Administration

Bridges & Structures

NMDOT

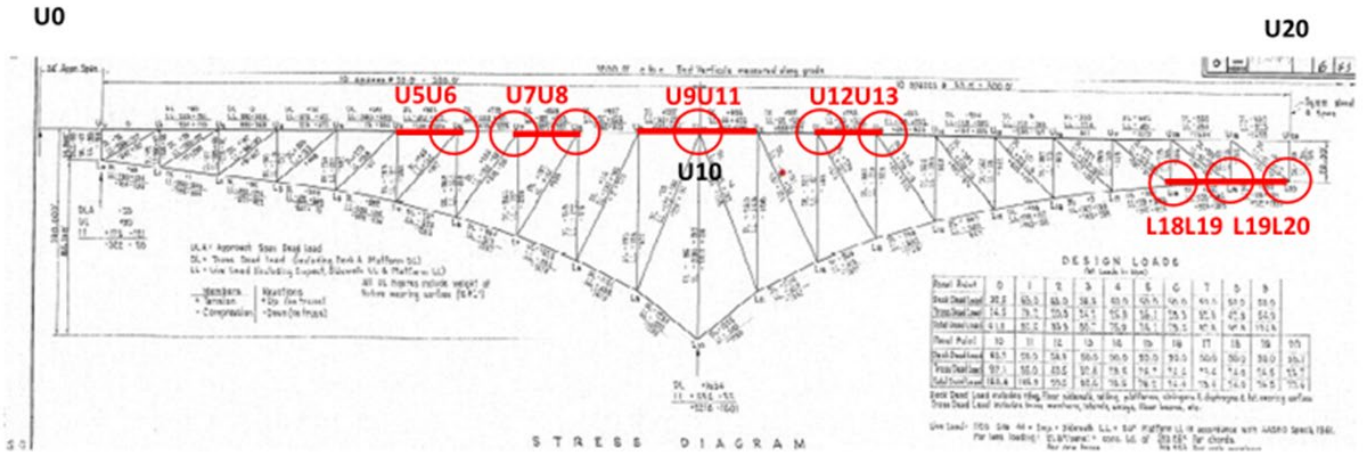
FHWA Memorandum

- December 13, 2021
- NDT Testing of all welds in tension in members fabricated from T-1 Steel
- March 31, 2024 deadline



Hernando de Soto and Sherman Minton Bridges

Locations requiring testing: bottom X 4 = 96 locations



Truss tension member with T1 steel and CJP butt weld

Joint location for CJP butt weld

Timeline

May 2021 Hernando de Soto Bridge

September 2021 Sherman Minton Bridge

December 2021 FHWA Memorandum requiring testing of T-1 steel bridges.

June 2022 Begin discussions with S-Brite

March 2023 S-Brite report for testing plan

April 2023 NMDOT Scope of Work

November 2023 RFP 24-09

December 2023 RFP Awarded to Ulteig

October 2024 Begin testing

January 2025 Completed defect coring

LEAD ABATEMENT & INSPECTION ACCESS

NONDESTRUCTIVE TESTING METHODS

Ultrasonic Testing

Magnetic Particle Inspection

DISCOVERY & DOCUMENTATION OF WELD DISCONTINUITIES

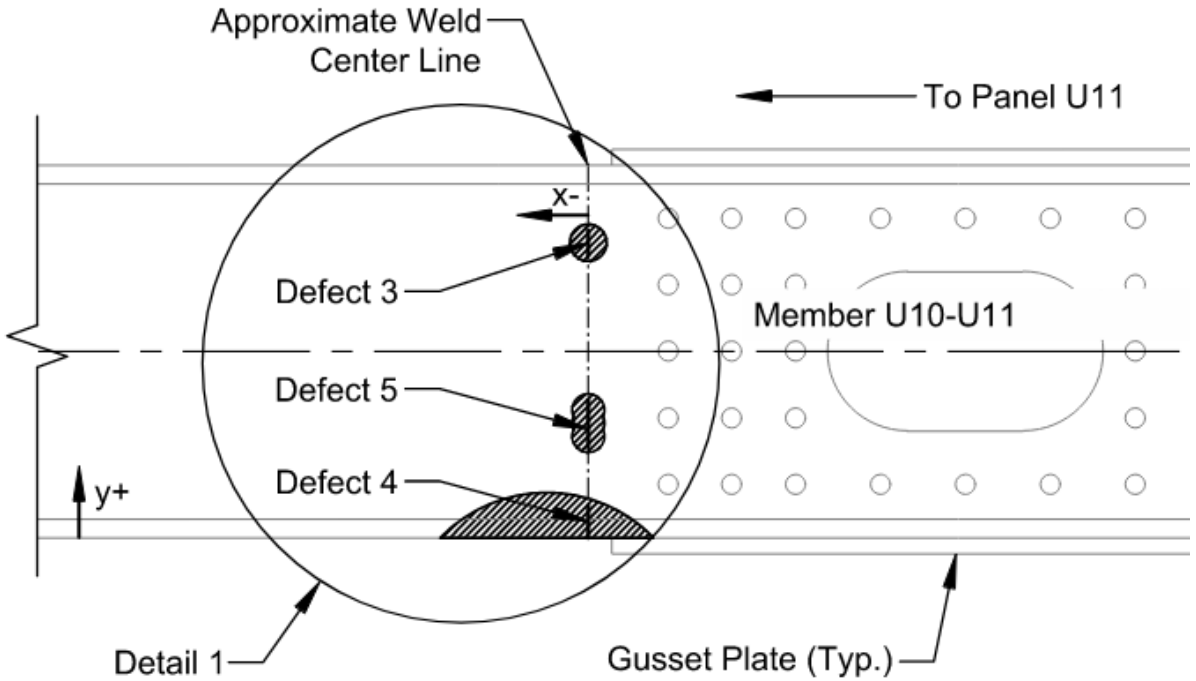
92 Welds Tested

12 Discontinuities Identified at 7 locations

- Lack of fusion or slag inclusion
- Varied from 0.5” to 2.25”
- None were found to be crack-like or surface breaking
- None warranted load posting or structure closure

CORING REPAIRS

CORING REPAIRS



Conclusion

92 T-1 BUTT WELDS IN NSTM INSPECTED AND TESTED

12 DISCONTINUITIES IDENTIFIED AND REPAIRED

NO STRUCTURE CLOSURE OR POSTING REQUIRED

MINIMAL DISRUPTION TO TRAVELING PUBLIC

COMPLIANT WITH FHWA MEMO


QUESTIONS?
NMDOT