

1995 SPECIFICATIONS:

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION SHALL GOVERN THIS IMPROVEMENT.

DESIGN DATA:

NEW MATERIALS INCORPORATED IN THE STRUCTURE CONFORM TO THE FOLLOWING:

- DESIGN LOADING - HS 20-44, CASE I AND THE ALTERNATE MILITARY LOADING
- STRUCTURAL STEEL - ASTM A36 - UNIT STRESS 20,000 PSI
- CONNECTION BOLTS - ASTM A325, 7/8" DIAMETER, GALVANIZED - FRICTION CONNECTION, SHEAR STRESS 15,000 PSI

TEMPORARY MATERIALS FOR BRACING AND JACKING CONFORM TO THE FOLLOWING:

- STRUCTURAL STEEL - ASTM A36 - UNIT STRESS 27,000 PSI
- HIGH STRENGTH THREAD BAR - ASTM A722 - ULTIMATE TENSILE STRENGTH 150,000 PSI, UNIT STRESS 105,000 PSI
- CONNECTION BOLTS - ASTM A325, 7/8" OR 1" DIAMETER - FRICTION CONNECTION, SHEAR STRESS 20,000 PSI

MATERIAL FABRICATION:

AISC CERTIFIED FABRICATOR WILL NOT BE REQUIRED. SHOP DRAWINGS ARE NOT REQUIRED. SHOP PAINTING OF NEW STRUCTURAL STEEL IS NOT REQUIRED.

WELDING TO EXISTING STEEL:

THE ORIGINAL DESIGN SPECIFICATIONS FOR LAK-90-2342 L&R INDICATE THAT ASTM A7 OR A373 STRUCTURAL STEEL WAS USED FOR THE STRUCTURE. WELDING TO THE EXISTING STRUCTURAL STEEL TO REMAIN IN PLACE WILL NOT BE PERMITTED.

FIELD PAINTING:

FIELD PAINTING WILL BE PERFORMED BY OTHERS.

SEQUENCE OF CONSTRUCTION:

1. INSTALL TEMPORARY FALSEWORK FOR WORK PLATFORM.
2. REMOVE LOWER PORTIONS OF DOWNSPOUTS AND REMOVE LOWER DOWNSPOUT BRACKETS. PLUG SCUPPERS AT DECK LEVEL AT U9' AND U8'.
3. INSTALL TEMPORARY LOWER LATERAL BRACE FROM SOUTH TRUSS TO NORTH TRUSS.
4. INSTALL GUIDE BEAMS.
5. REMOVE DIAGONAL LOWER LATERAL BRACES AND INSTALL AT NEW LOCATIONS. DIAGONAL LOWER LATERAL BRACES SHOULD BE REMOVED AND REINSTALLED ON THE SAME DAY. REMOVE TRANSVERSE LOWER LATERAL BRACE, GUSSETS AND ANGLES FROM BETWEEN TRUSSES AND CENTER CONNECTIONS.
6. ADD BOLTS (NOT ON LOWER JACKING PLATE) IN L8'L7' GUSSET PLATE CONNECTIONS AT L8' (ONE SIDE OF MEMBER AT A TIME).
7. INSTALL LOWER JACKING PLATES (ONE SIDE OF MEMBER AT A TIME). REMOVE EXISTING RIVETS. MATCH PLATE LOCATION TO THREE LOCATOR HOLES IN FABRICATED PLATE. FIELD DRILL HOLES IN PLATE TO MATCH RIVET HOLES. RIVETS REMOVED FROM AN EXISTING MEMBER SHOULD BE REPLACED THE SAME DAY. FIELD DRILL HOLES FOR NEW BOLT LOCATIONS AND INSTALL BOLTS.
8. INSTALL SUSPENDER BRACKETS AND RODS AND TENSION TO TAKE LOAD OF MEMBERS L8'U7'. TENSION EACH ROD WITH 120,000 POUNDS LOAD (DESIGN DEAD LOAD). THE FOUR RODS ON EACH MEMBER ARE TO BE TENSIONED AT THE SAME TIME. TIGHTEN NUTS ON RODS TO HOLD TENSION.
9. INSTALL NEW BOLTS IN PLACE OF BROKEN RIVETS IN NORTH TRUSS TENSION DIAGONAL U7'L8'.
10. ADD BOLTS IN L8'U7' GUSSET PLATE CONNECTIONS AT L8'.
11. REPLACE BOLTS TO STRENGTHEN THE U7'L8' GUSSET PLATE CONNECTION AT U7'. EXISTING BOLTS TO BE REMOVED ONE SIDE OF MEMBER AT A TIME. A MAXIMUM OF 4 HOLES SHALL BE OPEN AT ANY TIME.
12. INSTALL LOWER JACKING BRACKETS BY WELDING TO LOWER JACKING PLATES. ~~ADD REQUIREMENT TO~~ TEST FILLET WELDS FULL LENGTH PER CMS 513.21B. MAGNETIC PARTICLE INSPECTION OF WELDS.

13. INSTALL UPPER JACKING PLATES (ONE SIDE OF MEMBER AT A TIME). REMOVE EXISTING RIVETS. MATCH PLATE LOCATION TO THREE LOCATOR HOLES IN FABRICATED PLATE. FIELD DRILL HOLES IN PLATE TO MATCH RIVET HOLES. RIVETS REMOVED FROM A MEMBER SHOULD BE REPLACED THE SAME DAY. FIELD DRILL HOLES FOR NEW BOLT LOCATIONS AND INSTALL BOLTS.
14. INSTALL UPPER JACKING BRACKETS TO ALIGN WITH LOWER JACKING BRACKETS. FIELD WELD BRACKETS TO PLATES AND LOAD PLATES TO BRACKETS. ADD BRACING ANGLES BETWEEN INTERIOR AND EXTERIOR UPPER JACKING PLATES. ~~ADD REQUIREMENT TO~~ TEST FILLET WELDS FULL LENGTH PER CMS 513.21B. MAGNETIC PARTICLE INSPECTION OF WELDS.
15. INSTALL JACK ASSEMBLY TO TAKE LOAD OF COMPRESSION DIAGONAL AND VERTICAL. LUBRICATE ROCKERS AND LOAD PLATES WITH GRAPHITE OR SOAP. JACK TO A LOAD OF 182,500 POUNDS IN EACH JACK (50% OF DESIGN DEAD LOAD). SHIM AND BLOCK JACKS TIGHT. REMOVE HYDRAULIC PRESSURE FROM JACKS. BOLT GUIDE ANGLES TIGHT TO TOP AND BOTTOM ROCKER FRAMES.
16. CUT DAMAGED GUSSETS TO FREE DIAGONAL L8'U9' AND VERTICAL L8'U8'. CUT GUSSETS ON LINES ACCORDING TO DETAILS ON SHEETS 14 & 15. REMOVE DAMAGED PORTION OF GUSSETS.
17. INSTALL TEMPORARY TIE PLATE BETWEEN SWAY BRACE ANGLES IN PLANE OF L8'U8' ABOVE LOWEST GUSSET PLATE. THE SWAY BRACE ANGLES ARE TO BE DISCONNECTED DURING JACKING AND MOVING OPERATIONS, AND RECONNECTED AT THE END OF EACH DAYS WORK. RECONNECT BY ENLARGING HOLES IN TEMPORARY GUSSET PLATE.
18. INSTALL STIFFENER PLATES (ON U7'L8',L8'L9'), CLAMP BEAMS AND TENSION RODS FOR LATERAL MOVEMENT.
19. JACK AND MOVE L8'U9' AND L8'U8' VERTICALLY AFTER REMOVING THE JACK SHIMS AND BLOCKING, AND LOOSENING THE GUIDE ANGLE BOLTS. ALL VERTICAL JACKS SHALL BE OPERATED BY A SINGLE PUMP AND MANIFOLD. BOTH NORTH AND SOUTH TRUSS CONNECTIONS L8' ARE TO BE JACKED AND MOVED AT THE SAME TIME. VERTICAL JACKING SHALL CONTINUE UNTIL APPROXIMATELY 3 INCHES OF MOVEMENT HAS TAKEN PLACE ALONG THE LINE OF JACKS OR A MAXIMUM JACKING FORCE OF 510,000 POUNDS IS REACHED IN EACH JACK (140% OF DESIGN DEAD LOAD). SHIM AND BLOCK JACKS TIGHT. REMOVE HYDRAULIC PRESSURE FROM JACKS. BOLT GUIDE ANGLES TIGHT TO TOP AND BOTTOM ROCKER FRAMES.
20. MOVE L8'U9' AND L8'U8' Laterally to the north using clamp beams, tension rods and jacks. Wood blocking shall be placed and removed between the guide beams and members being moved to control the rate of movement. Both north and south truss connections L8' are to be jacked and moved at the same time. L8' U9' and L8'U8' shall be moved to the north approximately 4 inches until the displaced members align with the lower chord. Weld stop blocks on to upper and lower load plates adjacent to rocker after jacking is completed.
- 21A. CUT A 1/2 INCH PLYWOOD TEMPLATE TO THE REQUIRED SHAPES OF NEW PARTIAL GUSSET PLATE. MARK AT LEAST THREE LOCATOR HOLES IN THE TEMPLATE FROM HOLES IN EXISTING STEEL MEMBERS. PREPARE NEW PARTIAL GUSSET PLATE BY CUTTING TO THE SHAPE OF THE WOOD TEMPLATE AND DRILLING LOCATOR HOLES IN THE FIELD. FIT THE PARTIAL GUSSET PLATE TO BEAR ON THE LOWER JACKING PLATE.
- 21B. INSTALL PARTIAL GUSSET PLATES ON THE NORTH TRUSS INTERIOR AND SOUTH TRUSS EXTERIOR. REMOVE RIVETS FROM LOWER CHORD L8'L9' AND REMOVE BOLTS FROM DIAGONAL L8'U7', DIAGONAL L8'U9' AND VERTICAL L8'U8'. CUT AND PLACE FILL PLATES WITH ADHESIVE MATERIAL TO HOLD FILL PLATES IN PLACE. INSTALL NEW PARTIAL GUSSETS USING LOCATOR HOLES. CONNECT TO LOWER CHORD L8'L9', DIAGONAL L8'U9' AND VERTICAL L8'U8'. FIELD DRILL HOLES IN GUSSETS AND FILL PLATES TO MATCH HOLES IN EXISTING MEMBERS. INSTALL NEW BOLTS AS HOLES ARE DRILLED. FIELD DRILL HOLES FOR NEW BOLT LOCATIONS AND INSTALL BOLTS.
- 21C. HEAT STRAIGHTEN GUSSET PLATES TO TWIST AND MOVE THE L8' END OF DIAGONAL L8'U7' INTO ALIGNMENT WITH OTHER MEMBERS. CONNECT DIAGONALS L8'U7' TO PARTIAL GUSSET PLATES.
- 21D. INSTALL PARTIAL GUSSET PLATES ON THE NORTH TRUSS EXTERIOR AND SOUTH TRUSS INTERIOR. REMOVE RIVETS FROM LOWER CHORD L8'L9' AND REMOVE BOLTS FROM DIAGONAL L8'U7', DIAGONAL L8'U9' AND VERTICAL L8'U8'. CUT AND PLACE FILL PLATES WITH ADHESIVE MATERIAL TO HOLD FILL PLATES IN PLACE. INSTALL NEW PARTIAL GUSSETS USING LOCATOR HOLES. FIELD DRILL HOLES IN GUSSETS AND FILL PLATES TO MATCH HOLES IN EXISTING MEMBERS. INSTALL NEW BOLTS AS HOLES ARE DRILLED. FIELD DRILL HOLES FOR NEW BOLT LOCATIONS AND INSTALL BOLTS.

22. REMOVE JACKS, CLAMP BEAMS, TENSION RODS, SUSPENDER RODS, AND GUIDE BEAMS.
23. REMOVE SUSPENDER SEATS AND BRACKETS. FILL OPEN HOLES WITH BOLTS.
24. REMOVE UPPER JACKING PLATES AND BRACKETS (ONE SIDE OF MEMBER AT A TIME). FILL OPEN HOLES WITH BOLTS.
25. REMOVE LOWER JACKING BRACKETS BY CUTTING FROM LOWER JACKING PLATES. GRIND EDGES AND CORNERS SMOOTH TO TAKE PAINT. LEAVE LOWER JACKING PLATES IN PLACE. REMOVE THE TIE RODS FROM LOWER JACKING PLATES AND REPLACE WITH 7/8 INCH DIAMETER BOLTS.
26. REMOVE RELOCATED DIAGONAL LOWER LATERAL BRACES AND REINSTALL IN ORIGINAL LOCATIONS. DIAGONAL LOWER LATERAL BRACES SHOULD BE REMOVED AND REINSTALLED ON THE SAME DAY. INSTALL NEW LOWER LATERAL BRACE, GUSSETS AND ANGLES.
27. REMOVE TEMPORARY LOWER LATERAL BRACE. FILL OPEN HOLES WITH BOLTS.
28. REINSTALL DOWNSPOUTS AND STRAIGHTENED DOWNSPOUT BRACKETS.
29. REMOVE TEMPORARY FALSEWORK AND WORK PLATFORMS.
30. UNPLUG SCUPPERS AT DECK LEVEL AT U9' AND U8'.
31. OPEN EASTBOUND BRIDGE TO VEHICULAR TRAFFIC.

LOAD MONITORING:

THE TRUSS MEMBERS CONNECTED TO JOINT L8' AND THE SUSPENDER RODS ARE TO BE MONITORED FOR CHANGE IN LOADING WITH STRAIN GAGES. MONITORING IS NECESSARY TO INSURE THAT MEMBERS ARE NOT OVERLOADED. ALL GAGES ARE TO BE RECORDED DAILY EXCEPT DURING JACKING OPERATIONS. DURING JACKING, GUSSET REMOVAL AND UNLOADING OPERATIONS (SEQUENCE OF CONSTRUCTION STEPS #8, 15, 16, 19, 20 AND 22) GAGES ARE TO BE CONTINUOUSLY MONITORED AND RECORDED AT 5 MINUTE INTERVALS.

IT IS ANTICIPATED THAT STRAIN GAGE VALUES WILL NOT CHANGE FROM THE INITIAL READINGS EXCEPT FOR VARIATIONS IN TEMPERATURE. AFTER INITIAL INSTALLATION ALL GAGES SHALL BE RECORDED CONTINUOUSLY AT 30 MINUTE INTERVALS OVER A 30 DEGREE (F) TEMPERATURE CHANGE TO DETERMINE THE EFFECTS OF TEMPERATURE.

DAILY AND CONTINUOUS GAGE VALUES SHALL BE CONSIDERED NORMAL IF THE VALUES ADJUSTED FOR TEMPERATURE, CHANGE NO MORE THAN 10 PERCENT OF THE ALLOWABLE STRAIN IN THE MEMBER. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY CHANGES LARGER THAN 10 PERCENT OF THE ALLOWABLE STRAIN IN THE MEMBER.

MEMBER	10 PERCENT OF ALLOWABLE STRAIN (MICROSTRAIN -10 ⁻⁶)	
EXISTING TENSION MEMBER L8'L7'	62	(1,800 PSI)
NEW TENSION MEMBER-SUSPENDER RODS	362	(10,500 PSI)
EXISTING COMPRESSION MEMBER		
L8'L9'	52	(1,500 PSI)
L8'U9'	45	(1,308 PSI)
L8'U8'	44	(1,285 PSI)
L8'L7'	52	(1,494 PSI)

Job No. 96073GN Date 3/12/97 Drawn By JLS/JPS

RICHLAND ENGINEERING LIMITED
 29 NORTH PARK STREET
 MANSFIELD, OHIO 44902
 DATE 7/10/96
 REVIEWED DLR STRUCTURE FILE NO. 4304985
 DRAWN JLS
 CHECKED RWR 2/20/97
 DESIGNED DAP
 GENERAL NOTES
 BRIDGE NO. LAK-90-2342 R
 OVER THE GRAND RIVER
 LAK-90-23.42 L&R
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