

August 31, 2009

SPECIAL PROVISION

PROJECT # S-R399(42)
PROJECT # S-R399(59)
PIN # 6697/7236

SECTION 03253S

**BRIDGE CONSTRUCTION USING SELF-PROPELLED
MODULAR TRANSPORTERS (SPMT)**

Add Section 03253S:

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Calculations, shop detail drawings, manuals, and engineering data addressing bridge movement
- B. Confirm structural stress
- C. Execution of bridge movement
- D. Monitoring of bridge movement
- E. Post-movement inspection and remedial action

1.2 RELATED SECTIONS

- A. Section 00820: Legal Relations and Responsibility to the Public
- B. Section 03310: Structural Concrete
- C. Section 03924: Structural Concrete Repair and Sealing

1.3 REFERENCES

- A. AASHTO Guide Design Specifications for Bridge Temporary Works, 1st Edition, 2008 Interim Revisions
- B. AASHTO LRFD Bridge Construction Specifications, 2nd Edition, 2004, 2008 Interim Revisions

- D. UDOT Manual for the Moving of Utah Bridges with Self Propelled Modular Transporters (SPMTs)

1.4 DEFINITIONS

- A. Change in Longitudinal Gradient Along the Girders – The change in slope experienced along the edge girders from conditions just before first lifting to any time during transportation.
- B. Change in Transverse Gradient Across the Girder Span – The change in slope experienced along the end diaphragms from conditions just before first lifting to any time during transportation.
- C. Definitions and terminology used with SPMT systems - Refer to UDOT Manual for the Moving of Utah Bridges with Self Propelled Modular Transporters (UDOT SPMT Manual).
- D. Twist – The maximum allowable upward or downward deflection of one corner relative to the plane defined concurrently by the elevations of the other three corners.

1.5 SUBMITTALS

- A. Submit a schedule addressing the timing and sequence of fabrication and erection of the permanent substructure and superstructure, removal or demolition of the old structure, construction of temporary abutments, connections with the roadway, road closures, and the transportation of the superstructure.
- B. Submit working drawings and calculations before the start of the affected work to allow time for review by UDOT and the Engineer of Record and correction to be made by the Contractor without delaying the work.
 - 1. Show complete details and substantiating calculations of the method, materials and equipment to be used.
 - a. This right applies each time drawings are submitted.
 - 2. Do not deviate from the approved working drawings unless authorized in writing by the Engineer of Record.
 - 3. Bridge Staging Area (BSA) and Travel Path (TP).
 - a. Indicate all ground improvements, soft soil mitigation, and utility protection.
 - b. Verify clearances from above ground obstacles and provide mitigation.
 - c. Calculations indicating actual loads and actual ground bearing capacities.
 - 4. Selected movement system.

- a. Design the movement system to lift the bridge at the pick points indicated in the project plans.
 - b. Design the lifting system to provide wheel loads equal to or less than those indicated on the project plans.
 - c. Indicate that the selected lifting system will possess adequate stroke to negotiate the TP as designed.
 - d. Indicate any additional systems required to move the structure, for example such items may include skid shoes, climbing jacks, and strand jacks.
 - 1) Demonstrate that stresses provided in the project plans are not exceeded.
 - e. Indicate that the selected lifting system will possess electronic steering capability allowing for movement forward and backward, transversely, diagonally, at any angle, and in a carousel motion.
 - f. Indicate that the selected lifting system will provide equal support to all girders.
 - g. SPMT mobilization.
 - 1) Indicate preparatory work necessary for moving personnel, SPMT equipment, supplies, additional equipment used to move the bridge, and incidentals to the project site before beginning work.
 - h. Provide pre-operations checklist.
5. SPMT Support Apparatus
- a. Design SPMT Supports to meet AASHTO Guide Design Specifications for Bridge Temporary Works, 1st Edition, 2008 Interim Revisions and 2nd edition 2004 AASHTO LRFD Bridge Construction Specifications, 2008 interim revisions.
 - b. Calculate the anticipated lateral forces due to for example braking, turning, and vertical grades and provide a system to transfer loads to SPMTs.
 - c. Provide working drawings for the carrier beams when carrier beams are required.
6. Temporary abutments
- a. Refer to Section 03310.
 - b. Design temporary abutment to meet AASHTO Guide Design Specifications for Bridge Temporary Works, 1st Edition, 2008 Interim Revisions.
7. Movement Plan.
- a. Provide schedule for lifting, transporting, and placing the new structure.
 - b. Indicate all required equipment and operations.
 - a. Indicate monitoring equipment and operations.
8. QA/QC procedures

- C. Submit working drawings stamped by a professional engineer licensed in the State of Utah.
 - 1. Submit all shop drawings to the Engineer electronically in 11 inch X 17 inch format with the Department project designation data, drawing number, and sheet number in the lower right hand corner.
 - 2. Provide design of BSA and TP meeting criteria in UDOT SMPT Manual.
- D. Provide MOT plan and schedule.
- E. Contingency plans to address equipment breakdowns and site issues.
- F. Provide Safety plans.
 - 1. Refer to Section 00820 Legal Relations and Responsibility to the Public.
 - 2. Provide a plan addressing the protection of vulnerable personnel and property during the movement of the bridge.

PART 2 PRODUCTS

2.1 BRIDGE CONSTRUCTION USING MOVEMENT SYSTEMS

- A. Provide all materials for the permanent features of the project in conformance with UDOT specifications and per the requirements of the design plans.
- B. Provide all temporary features of the project suitable to sustain applied forces.

Part 3 EXECUTION

3.1 PREPARATION FOR TRANSPORT OF SUPERSTRUCTURE

- A. Follow established and submitted QC/QA procedures.
- B. Follow Pre-Operations checklist.
- C. Obtain UDOT's approval for all temporary Traffic Control Plans (TCPs) and Traffic Operational procedures prior to transportation.
- D. Implement traffic control prior to transportation.
- E. Hold a pre-activity meeting and site visit no more than 8 hours before the move.

3.2 LIFT, TRANSPORT, AND PLACEMENT OF SUPERSTRUCTURE

A. General

1. Check elevations of bearing seats and tops of bearings prior to lifting bridge.
 - a. Notify the Engineer of Record and UDOT of differences between as-built and as-planned bearing elevation and submit proposals for corrective adjustments.
2. Lift and transport structure in accordance with the lifting points established in the drawings.
3. Do not exceed the SPMT ground pressures for the supporting capacity of the soil, roadway construction, or any structures over which the load will travel.
4. Follow approved working drawings for the positioning of the SPMTs.
5. Follow specified allowable limits for loss of support by any pair of wheels or axle lines.
6. Implement contingency plans in the event of a major breakdown of equipment to complete the installation with minimal disruption or delay to traffic.
7. Deliver the structure to its final location with no damage or loss of strength, performance, or long-term durability.

B. Monitoring

1. Monitor the span for stability and integrity of the SPMT system during lifting, transport, and placement following the plans for the equipments and methods of monitoring.
2. Monitor deflection and twist control during transportation.
3. Obtain deflection and twist tolerances from the Engineer of Record.
4. Provide measurements to the Engineer of Record and UDOT for actual deflection and twist during lift, transport, and setting.
5. Halt operations immediately if deflection or twist exceed allowable limits as designed by the Engineer of Record, returning bridge to temporary supports if necessary.

C. Tolerances

1. Plan alignment, location, and clearances for the final condition of the span after placement.
2. Do not exceed 1 inches for spans under 100 ft, and 1.5 inches for spans over 100 ft at each end of the span for maximum deviation from overall longitudinal alignment of an individual span after setting.
3. Do not exceed 1 inches for spans under 100 ft, and 1.5 inches for spans over 100 ft for maximum deviation from the overall transverse location at each line of bearing.

4. Do not exceed 1 inches for spans under 100 ff, and 1.5 inches for spans over 100 ft for maximum yaw.
 5. Maintain individual elements or surfaces within 1 inches for spans under 100 ft, and 1.5 inches for spans over 100 ft of location with respect to similar matching surfaces at expansion joints (plane of web parapet) of adjacent spans, pier or abutment features in the absence of other constraints.
 6. Provide the maximum allowable change in longitudinal gradient along the girders.
 - a. Calculate change from differences between the elevations taken just before lifting and the elevations taken at any time during transport.
 7. Provide the maximum allowable change in transverse gradient across the girder span.
 - a. Calculate change from differences between the elevations taken just before lifting and the elevations taken at any time during transport.
- D. Deck Repair
1. For any cracks in excess of the limits indicated on the plans repair as per Section 03924 Structural Concrete Repair and Sealing.

END OF SECTION