

Section 8 - Reconstruction and Rehabilitation Projects

8.1 Concrete Bridge Decks

In the processes that are involved in construction, rehabilitation and reconstruction of concrete bridge decks, with special emphasis on overlay protective systems, the following terminology shall apply:

1. Construction means the initial construction of any specific bridge deck.
2. Maintenance means routine or incidental work necessary to keep a bridge deck functioning in a safe and efficient manner.
3. Overlay Protective System means a system used to protect bridge decks from deterioration induced by highway deicing chemicals, salt water, or other hostile environments.
4. Reconstruction means the restoration of the structural integrity of a concrete bridge deck by complete removal and replacement of the existing deteriorated bridge deck.
5. Rehabilitation means the work necessary to restore the structural integrity of portions of the original bridge deck as well as the installation of a overlay protective system.

The following policies are established for all bridge decks to be constructed, rehabilitated or reconstructed with Federal-aid funds.

1. Standard Specifications. Criteria that is included in the *NJDOT Specifications for Road and Bridge Construction* shall be adhered to.
2. High Performance Concrete (HPC). HPC deck slabs that are designed for reliability and durability shall be the primary protective system for bridge deck construction.
3. Overlay Protective System. When planning roadway resurfacing projects or bridge rehabilitation projects, a cost effective Overlay Protective System should be evaluated.
4. Eligible Work. Reconstruction and rehabilitation procedures necessary to assure acceptable performance of existing structures are set forth below and are eligible for Federal-aid participation from the appropriate category. Reconstruction and rehabilitation shall include all work required to assure satisfactory performance of the concrete deck, as well as supporting superstructure and substructure units.
 - a. This may include the removal of existing overlays, removal and replacement of all deteriorated components or the complete removal and replacement of the entire bridge deck.
 - b. This work may also include repair or removal and replacement of deteriorated concrete curbs, sidewalks, parapets, deck joints, bearings or similar incidental items which are associated with proper functional restoration of the structure.
 - c. Safety improvements should be undertaken when such improvements eliminate an established hazardous condition. Such safety improvements may include widening, elimination of hazardous walks and substandard safety hardware, removal of hazardous fixed objects or the installation of energy absorbing barrier system and any other features that are consistent with current safety standards.

5. Projects that include the replacement of a bridge deck or complete superstructure replacement shall utilize the *AASHTO LRFD Bridge Design Specifications* to design the deck slab or entire superstructure. Also, refer to 8.6, herein, for additional guidance.

8.2 Field Condition and Appraisal Survey

1. Where an existing bridge or structure is to be widened, altered, reconstructed or rehabilitated, the Evaluation Survey Report for the bridge shall be studied to verify component conditions, rating analysis and recommended repairs.
2. In conjunction with the review of the Report, a limited Field Condition Survey shall be made to update the original inspection report. A Supplementary Report shall be written and include recommendations for additional work together with a preliminary cost estimate. The Supplementary Report shall be submitted prior to Preliminary submission.

The Department will determine and authorize the extent of the work to be included in the Contract Plans.

3. Consistent with the definitions established in Subsection 8.1 above, safety improvements shall be considered for all reconstruction and rehabilitation projects. Recommendations shall be included in the Supplementary Report. If not already included in the Scope of Work, the Department will determine and authorize the extent of work to be included in the Contract Plans.
4. The minimum vertical underclearance shall be verified. If the underclearance is substandard, a commentary about the extent of work that is needed to improve the situation, together with a preliminary cost estimate, shall be provided. The Department will determine if a detailed retrofit study is warranted.

8.3 Deck Slab Reconstruction (Replacement)

1. Deck slab replacements shall be designed in accordance with the *AASHTO LRFD Bridge Design Specifications* and other applicable provisions of this Manual. Existing stringers and/or beams must be analyzed to determine if additional Dead Load stresses may be introduced. Secondary Dead Load design requirements may also be a factor.
2. If the deck slab reconstruction work should impact bridge approach areas, the Design Engineer should refer to Subsection 20.10 of this Manual for guidance concerning provision of approach slabs.
3. If calculations indicate that the existing stringers and/or beams may become significantly overstressed, the matter, together with recommendations, should be brought to the attention of the Manager, Bureau of Structural Engineering.
4. Special measures such as requiring the use of removable deck forms, retrofitting stringers with shear connectors, shear connector replacement, design criteria exceptions, etc. may be required.

Additionally, the height of shear connector studs on the existing stringers should be considered. Additional studs may have to be added in order to conform to the design criteria under Subsection 24.6.

8.4 Special Conditions

Any changes in the condition of the bridge superstructure, current at the time of the Final Plan Processing for the receipt of construction bids, which influence previous design decisions, should be considered. Special Provisions may be required in the

Plans and Special Provisions for the following (if not already included in the contract documents):

- Construction Staging.
- Traffic controls and diversions.
- Authorized detours.
- Restricted working hours or days.
- Load restrictions for construction equipment.
- Posting for reduced speeds, substandard vertical underclearances and/or load capacities.

8.5 Closure of Movable Bridges

1. Contracts involving reconstruction or rehabilitation of movable bridges, where closures are expected, shall have suitable provisions written into the Special Provisions to conform to the regulations of the U.S. Coast Guard.
2. Requests for U.S. Coast Guard approval of proposed closures shall be channeled through the Manager, Bureau of Structural Engineering. Approval shall be received prior to advertising the contract for bids.

8.6 Superstructure Replacements or Bridge Widening Projects

1. **Superstructure** - Superstructure replacements shall be designed in accordance with applicable criteria of the *AASHTO LRFD Bridge Design Specifications* and as may be amended within this Manual. Bridge widenings that will exceed 30% of the deck slab area will similarly be designed according to the *AASHTO LRFD Bridge Design Specifications*.
2. **Substructure** - The existing substructure of a bridge that meets the above replacement or widening criteria shall be analyzed based on LRFD design criteria for Strength 1 limit state following AASHTO LRFD Design Specifications by applying the design load (HL-93) to the reconstructed conditions.