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14. Supplementary Notes

15. Abstract

Purpose and Need

A bump often develops at the end of a bridge near the interface between the abutment and the embankment or if an approach slab is used between the end of the approach slab and the embankment. Reduction in steering response, distraction to the driver, added risk and expense to maintenance operations, and reduction in a transportation agency's public image are all undesirable effects of these uneven irregular transitions. A bump that is allowed to persist increases the chance of damage to the bridge deck from the dynamic impact of vehicles. These impact loads have been estimated to be four or five times larger than the static loads. Damage to the bridge deck can also be caused by snowplows in the winter. In addition, the bump can cause damage to vehicles.

The bump at the end of the bridge is a complex problem involving a number of components, including the natural soil on which the embankment and the abutment are built, the approach fill material, the foundation type used for the bridge abutment, the abutment type, the structure type, the bridge/roadway joints, the approach slab, the roadway paving, and the construction methods. Survey results indicate that integral bridge abutments appear to be a special case where a bump is consistently created resulting from temperature cycles and the associated compression and decompression of the approach fill by the abutment wall.

The conventional method of constructing the embankment behind an abutment wall has not prevented the bump at the end of the bridge to any great degree.

Objective

The objective of this experimental feature is to build a better foundation under the approach slab that will eliminate the bump at the end of the approach slab.

Scope

The work shall be to construct a select backfill behind a bridge abutment incorporating geotextile wrapped layers in one foot lofts. Also to construct a 20:1 slope under the select backfill and carry it out until it intercepts the base course. A good drainage system to prevent erosion will also be provided. The experimental feature is located on the Burlington Separation project NH-4-002(051)138. It will be constructed on the approach end of the bridge in the eastbound lanes. The construction report includes construction costs, constructability of each section, and different equipment needed. Annual reports address performance of the standard section verses the geotextile wrapped section, maintenance costs, advantages/disadvantages, and stresses such as cracking, heaving, or slumping. Evaluation reports will be written every two years for the next 10 years.

Summary

The experimental feature was constructed with little difficulty and needed no extra equipment than what was used on the rest of the project. The cost of the experimental feature added no significant amount toward construction compared to the conventional method. The elevation survey taken of the approach slab and transition has shown the settlement of the approach slab. The bump at the end of the bridge is acknowledged as a stand-alone design issue and its prevention should be a design goal. The problems of differential settlement, erosion, and compaction represent the major components of the bump problems. This design has not prevented the bump at the approach slab and corrective action was taken to restore the approach slab. Mud-Jacking was conducted to lift the slabs to their original elevation. This experimental study was discontinued.

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