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**January 26, 2001**

RESEARCH UPDATE U 2000-9

# GLASGRID® PAVEMENT REINFORCEMENT BRIGHTON, VT ROUTE 105 BARNET, US ROUTE 5 (INITIAL REPORT)

## REFERENCES:

WP 95-R-11

## INTRODUCTION:

In 1998, GlasGrid® pavement reinforcement was applied on two separate projects, Charleston-Brighton STP 9716(1)S, and Barnet-St Johnsbury STP 9624(1)S. The Charleston-Brighton (VT Route 105) site and the Barnet-St Johnsbury (US Route 5) site consisted of the placement of a leveling and wearing course.

## PRODUCT DESCRIPTION:

GlasGrid® pavement reinforcement is a self-adhesive, open mesh fabric, produced from high strength, low elongation glass fiber rovings, which are coated with an asphalt compatible bituminous coating. The two systems manufactured, Complete Road System (8501) and Detail Repair System (8502), are both designed with a 12.5mm x 12.5mm grid and identical material composition. The 8501 product is constructed as a single strand mesh. The 8502 product is constructed with a single strand longitudinally and a double strand transversely, doubling the tensile strength along its width.

The placement of this material requires the road surface to be smooth, clean and dry. A tack coat is not recommended. In the case of a leveling course, as with both these projects, the material should be placed on the leveling course for better bonding between the roadway and the mesh. The material must be lapped a minimum 50mm longitudinally and 150mm on the ends. To reduce reflective cracking, the compacted asphalt overlay thickness must be at least 40mm.

## CONSTRUCTION:

### Charleston-Brighton (VT Route 105)

On October 6-7, 1998, GlasGrid® pavement reinforcement was placed on a portion of VT Route 105 in the town of Brighton. A preliminary survey of the test site revealed 1685 m/100m of cracking, with severe alligator cracking in the eastbound lane.

The material selected for the project was GlasGrid® Complete Road System (8501). The test site, located on a flat, tangent section of roadway, included both travel lanes (Figure 1). On October 6, the westbound lane was swept clean and 39.4m of grid was placed the width of the lane on the leveling course. The lane was paved with a 35mm wearing course, with no asphalt emulsion used between courses. A product representative, Alan Ward, of Nead Products, Lewiston, N.Y., was present for the installation.

On October 7, the eastbound lane was constructed with GlasGrid®. The material was placed in an L-shaped configuration with an overall length of 30.6m. Some areas adjacent to the westbound lane were not covered to allow for a side-by-side comparison. An inspection of the site prior to the placement of the 35mm wearing course revealed considerable quantities of small aggregate under the grid, especially along the centerline joint. This was due to the lack of surface cleaning prior to the placement of the grid. The overlap of the GlasGrid® at the centerline was less than the minimum required.

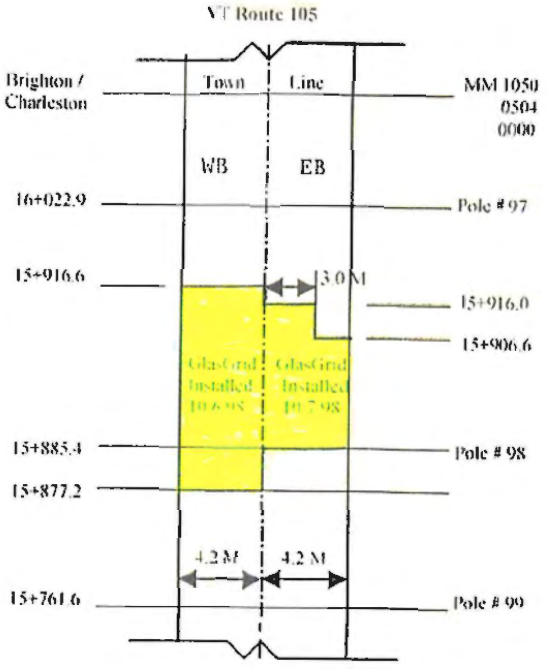


**Figure 1. GlasGrid® layout in Brighton.**

### Barnet-St Johnsbury (US Route 5)

On September 25, 1998, GlasGrid® pavement reinforcement was placed on a portion of US Route 5 in the town of Barnet. A preliminary crack survey of the test site clearly defined the location of the underlying concrete road base, with longitudinal and full-length transverse cracking. Severe fatigue cracking in the outside wheel paths was also evident, a distress possibly associated with the gravel subbase structure beneath the asphalt overlay, adjacent to the concrete slabs. This was probably created by the widening of the original concrete roadway.

The test area, located on a horizontal curve on a downhill grade, was placed over the outside wheel path of the southbound lane. The test area was comprised of a 30m x 1.5m single layer of GlasGrid® Detail Repair System (8502). The material was installed by hand, being pulled from a roll attached to the back of a pickup truck (Figures 2 & 3). Placed with the tacky side down on the leveling course, the material was then coated with asphalt emulsion and resurfaced with a 40mm wearing course. There was no manufacturer's representative present during the installation.

**Figure 2.** **Installing GlasGrid® in Barnet.**

**Figure 3.** **Placement of GlasGrid® in Barnet.**

## PERFORMANCE:

### Charleston-Brighton (VT Route 105)

In 1999, after one year of performance, the GlasGrid® test site had shown no evidence of reflective or stress related cracking. A longitudinal crack developed along the centerline both within and outside the test site area (Figure 4). Also worthy to note, the overall performance of the project area on the immediate ends of the test section had not developed any cracks.

In May 2000, after 1½ years of performance, the test site began to show evidence of very slight cracking in the westbound lane. Two areas were identified, one near Sta. 15+916.6 and another located just westerly of the first. These hairline cracks, about three feet in length, were located in the center of the travel lane (Figure 5). No evidence of this type, or any other type of cracking was present in either the eastbound or westbound lane. The same type of hairline cracking occurred outside the test area, in the same lane, just east of the GlasGrid® location. The longitudinal crack along the centerline appeared unchanged.

**Figure 4.** **Brighton, one year after placement.**
(Photo taken October, 1999)

**Figure 5.** **Development of hairline cracks.**
(Photo taken May, 2000)

**Barnet-St Johnsbury (US Route 5)**

In 1999, after one year of performance, transverse cracking began to develop in the northbound lane, adjacent to the test site. Two of these cracks extended into the southbound lane to the edge of the grid material, but the test area remained free of transverse and longitudinal cracks (Figure 6).

In May 2000, after 1½ years of performance, the GlasGrid® test area had developed transverse cracks. Two full-length transverse cracks were located approximately 9m and 24m south of the north edge of the GlasGrid® placement (Figure 7). Although, no other cracks were evident in the test site area, transverse cracking was typical both north and south of the test site.

**Figure 6.** **Barnet, one year after placement (24m south of material's north edge).** (Photo taken November, 1999)

**Figure 7.** **Full-length transverse crack, developed after 1 ½ years performance (9m south of material's north edge).** (Photo taken May, 2000)

**SUMMARY:**

Two projects were constructed in 1998 using GlasGrid® pavement reinforcement. One project was constructed using the Complete Road System (8501), the other, the Detail Repair System (8502). After 1½ years of service, cracking had developed at both test sites.

The Brighton site utilized the Complete Road System (8501) product. This product, designed with a single strand mesh in each direction, provides equal strength both longitudinally and transversely. GlasGrid® installation at this site included both travel lanes, and in one lane, was under the direction of a manufacturer's representative. The placement of the second lane did not have the same quality control, and the surface preparation was not as recommended. The first of these two lanes has exhibited cracking which is similar to cracking in the same lane outside the test area. The lane adjacent had no signs of cracking. The travel lanes were constructed with a 35mm wearing course, 5mm less than that recommended. It is uncertain if this could be associated with the cracking in the test site area.

The Barnet site utilized the Detail Repair System (8502) in the outer wheel path of the southbound lane. This product, designed with a double strand across its width, provides twice the tensile strength in the transverse direction. The test site showed no signs of longitudinal cracking, but transverse cracks appeared within and outside the test area. This failure is probably reflective cracking associated with the movement of the underlying concrete road base. It is uncertain if the use of the asphalt emulsion between pavement layers including the GlasGrid,® a practice not recommended by the manufacturer, could have contributed to the early failure of the material.

## FOLLOW-UP

Performance monitoring will continue for both projects until firm conclusions can be made as to the performance of the pavement reinforcement material.