

## EVALUATION REPORT

### FIBER-REINFORCED POLYMER (FRP) PULTRUDED DECKING MATERIAL AND HELICAL ANCHORING SYSTEM FOR USE IN SNOW FENCE APPLICATIONS

Location: Livingston, Montana. Interstate 90, MP-332, Park County

Project No.: IM90-7(63)331

FHWA No.: MT 00-01

Description: Fifth semi-annual evaluation of remaining test section of snow fence using proprietary EZ-Deck Fiber-Reinforced Polymer (FRP).

Evaluation Date: April 10, 2002

Participants: Craig Abernathy-Research Specialist

#### Objective



**Figure 1**

The purpose of this study is to evaluate the feasibility of using a fiber-reinforced polymer (FRP) material in the construction of snow fences. FRP is a process where continuous glass-fiber strands are pulled through a thermosetting polyester resin (or matrix) to form a composite. The main purpose of testing the FRP product is to determine its structural integrity based on MDT's current snow fence design specifications (as seen with section TS1), especially with the harsh climate these structures are subjected to in the state of Montana. In addition, to compare this material in determining its design function as a possible

alternative for MDT current specifications for the construction of snow fences (TS1 vs. TS2). As noted in the Spring 2001 report, section TS2 was found collapsed and was assumed a structural-related failure due to the three rear supports buckling or snapping in high winds.

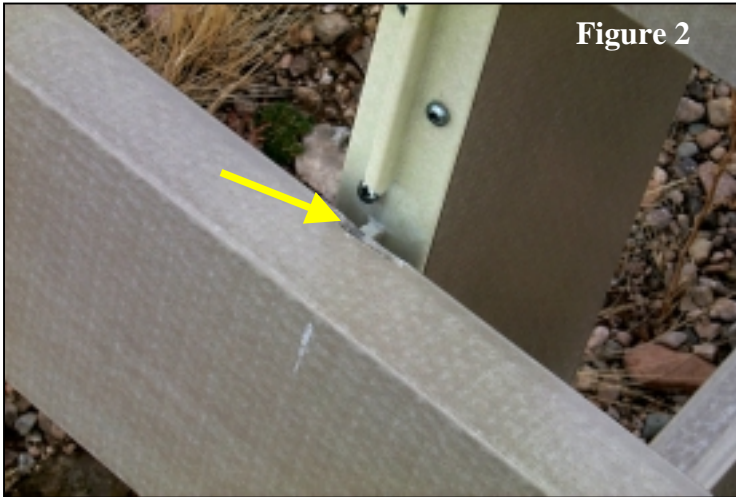
The final purpose was to test the Helical Anchoring System as a reliable ground attachment for snow fences (used in TS2). As stated earlier, section TS2 was found collapsed in the early spring of 2001, the helical anchors were not affected by this failure. In addition, the anchor supports competently held the FRP braces on the ground (refer to May, 2001 report)

Inspections are held in early spring and late fall to document the environmental effects of seasonal extremes of the FRP material as well as stability of design. Figure 1 shows the remaining section TS1 as seen on April 10.

### Evaluation

The evaluation consisted of a visual inspection of the FRP material and the structural supports. Special attention was given to the attachments of the FRP planks, (setting screws, FRP clips).

As detailed in the October 2001 inspection, the FRP plank, at the top of the center clip attachment, seems to have broken or sheared off. Figure two shows a close-up of the broken clip. The screw used to help secure the plank to clip remains. The plank shows the damage from the screw head as it (apparently) was pulled away. We



can assume stress on the front panel from wind turbulence could have caused the separation. This occurrence is just on one clip attachment. The damage was not noticed on any other areas of the test section during this inspection. No additional movement was noticed during this evaluation, all other connections used to attach the FRP planking to the frames are intact with no evidence of loose screws or chipping of the FRP rail attachments. Visual appearance of all the FRP material and plank connections shows no signs of deterioration or sun or wind degradation.



As noted in the October 2000 Report. The right, rear bolt attachment to the frame sill has broken (Figure 3). During this investigation, it was observed the sill had jumped once more to cover the broken bolt of the rear ground support. This broken sill support has, up to this time, not caused a catastrophic failure of section TS1. Nor is there any evidence that this loose rear sill attachment may have caused stress that allowed the center clip bracket to shear off. It was also observed the front frame to bolt attachment has bent slightly. This may be the result of the freedom of the rear connection, which is allowing the stress from wind turbulence to deflect the bolt. The sill frame will be closely monitored in future evaluations.



At this time, section TS1 is rated as performing well.