

## 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: Third semi-annual evaluation of two test sections of snow fencing using two proprietary materials; EZ-Deck FRP and A. B. Chance Helical Anchoring System.

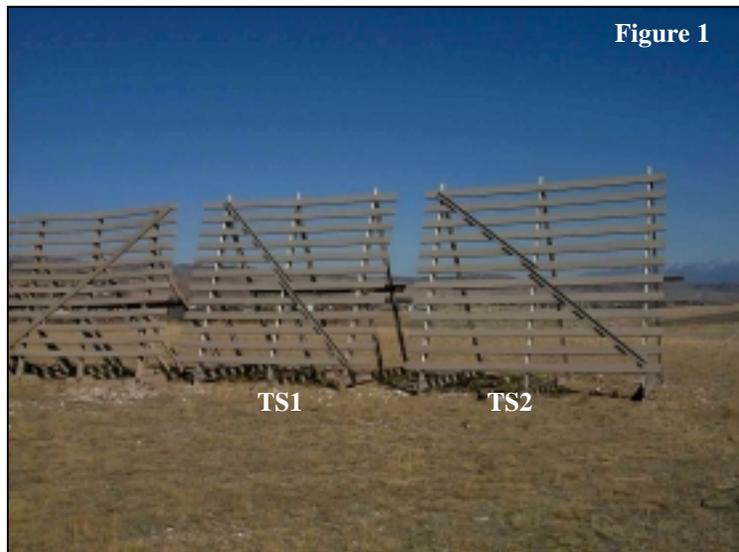
Evaluation Date: May 8, Tuesday 2001

Participants: Craig Abernathy-Research Specialist

#### Objective

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 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 (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). The final purpose was to test the Helical Anchoring System as a reliable ground attachment for snow fences (used in TS2). 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 sections TS1 & TS2 as seen in October of 2000.



#### Evaluation

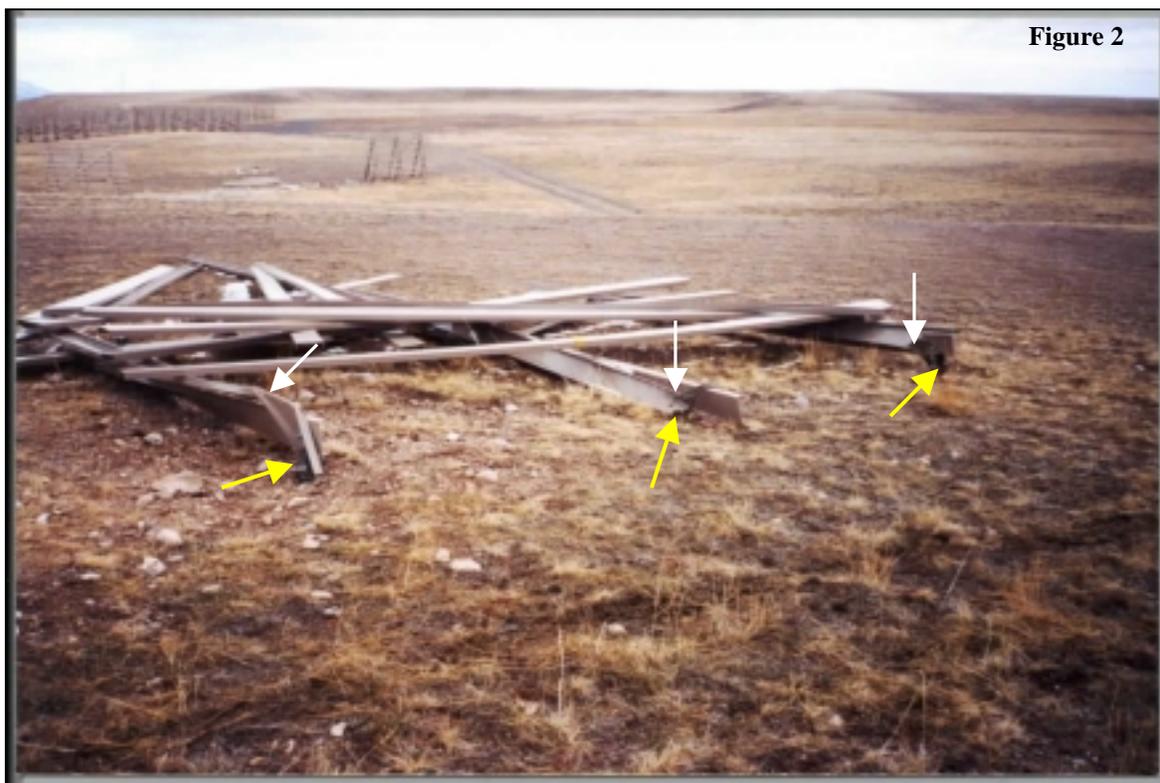
The evaluation consisted of a visual inspection of the FRP material and the structural supports.

Upon arriving to the test section site, it was discovered that section TS2 had been removed. No other FRP material or helical attachments for this section were found at the test site. Remnants of the FRP clip attachments were scattered in the area. Section TS1

showed no degradation of material, all support hardware and attachments appeared to be in the same shape as was reported in the fall (2000) evaluation.

Research conducted an investigation as to the reasons that this test section had been removed from the experimental site. Conversations were held with individuals involved with the current Livingston Snow Fence Construction Project, this included MDT Construction and Maintenance staff, and Riverside Contracting. Consensus was that there was a lack of communication between all parties involved. Research should have been notified when the structure was first noticed down. This would have given the inspection team the opportunity to personally inspect the site. In the future with experiments of this type, Research will install a sign or placard to indicate that Research staff should be notified before any disturbance of the site.

On all accounts, it has been stated that this section was seen collapsed on the ground viewed by MDT staff at the earliest date of March 2, 2001. We concur that sometime before this date and after the Fall 2000 evaluation this structure failed. Duane Rabine of Riverside Contracting supplied Research with images of the collapsed structure. With review by the experimental team, all evidence suggests that this was a wind-related failure. Figure 2 shows TS2 as collapsed.



The yellow arrows show the FRP material still attached to the end helical bracket bolts and the center sill connection. The white arrows show where the FRP material has fractured just above these connections. It is speculation only, but it has been suggested since this design had only three rear supports (as can be seen in figure 3) that one or more of these supports snapped under high wind. In turn breaking or twisting the front bracing to failure. TS1 (MDT design) has an additional three braces for support (see figure 4); this may be the reason this structure has not, at this time, been affected by high winds. It is noted that the helical anchors used to secure TS2 were not affected and are still in the ground.

### Conclusion

Based on the supplied images and interviews with staff viewing the TS2 Section on the ground, it is our opinion that TS2 suffered structural failure due to high winds. Visually, TS1 is in the same condition as seen in the October 2000 evaluation and is rated as performing well. The helical anchors used in the TS2 section performed well during the structural failure in keeping the sill and bracing attachments in place. Regardless of

the destruction of TS2, This experiment evaluating the FRP Material will continue through the formal evaluation period on section TS1.



On the left is FRP TS2, above is FRP TS1.