



# LANDLOK<sup>®</sup> REPORT

An Erosion Control Case Study From Synthetic Industries

## Landlok<sup>®</sup> TRM 450 Dominates Texas DOT Channel Lining Performance Tests

### Background

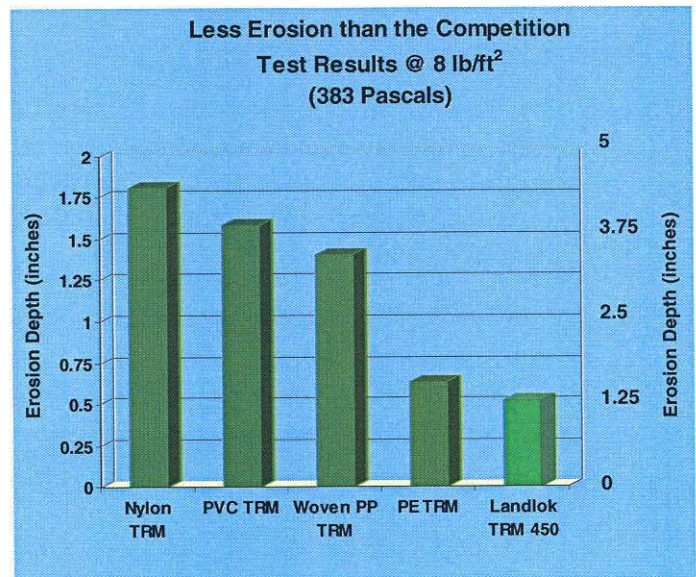
In order to satisfy the Texas, U.S.A., Department of Transportation's (TXDOT) needs for high quality erosion control materials, Synthetic Industries (SI) initiated testing of its Landlok<sup>®</sup> TRM 450 turf reinforcement mat with the Texas Transportation Institute (TTI). The institute evaluated the performance characteristics of a variety of erosion control materials installed as channel linings. TTI tested nine rolled products for their ability to protect channels from excessive erosion as well as promote the establishment of vegetation. The results proved Landlok TRM 450 was among the top performers in flexible channel lining tests. Landlok TRM 450 is approved by TXDOT for use in channels exhibiting shear stresses of up to 8 lb/ft<sup>2</sup> (383 Pascals [Pa]).

### Channel Preparation

Five 100 percent synthetic turf reinforcement mats and four temporary degradable erosion control mats were installed in outdoor test flumes. Prior to installation, TTI determined the roughness coefficient (i.e., Mannings "n") for all products using an indoor flume. Following installation, each product experienced a 90-day resting period to promote vegetative growth prior to initiating the series of increasing shear stress flows. However, this 90-day period was not long enough to observe significant degradation of the natural products. As a result, the long-term benefits of the synthetic mattings were not recognized when compared to the diminished performance of the temporary erosion control blankets as degradation progressed.

### Test Method

In order to evaluate the tests, a series of increasing flows was repeated twice and continued for 20 minutes after a stable flow had been achieved.



Therefore, this test simply measured the ability of the composite materials to resist short-term (20 minute) storm events. After each flow, measurements were taken to determine the amount of soil displaced. The acceptance or rejection of each product was determined by comparing soil erosion and vegetation density within the channel to the adopted TXDOT standards.

### Summary of Results

The TTI Hydraulics and Erosion Control Laboratory allows TXDOT to select erosion control products which have demonstrated their capability to perform under conditions similar to a natural environment. This lab provides the industry with a uniform testing program for products considered appropriate for use within TXDOT's construction and maintenance activities. Landlok TRM 450 was the top performer in a very challenging real-world test environment, displaying the lowest sediment loss of any TRM tested at 8 lb/ft<sup>2</sup> (383 Pa).

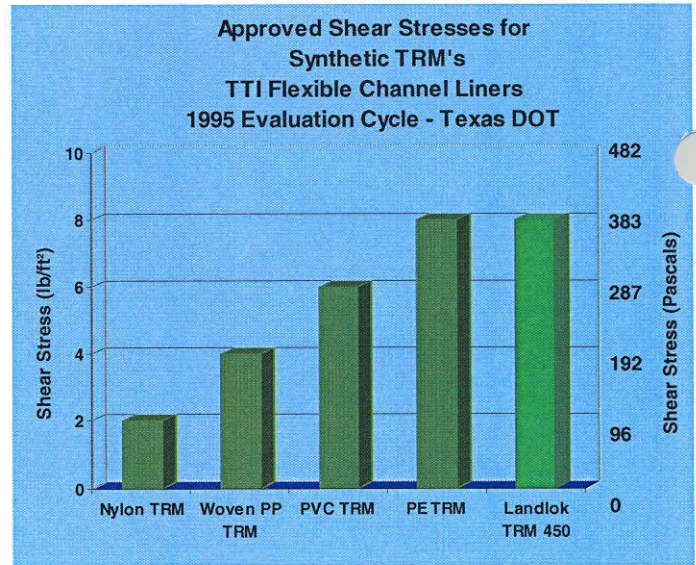
## Conclusions

The TTI test results demonstrate the superiority of Landlok® TRM 450 over other turf reinforcement mats. In addition, these findings confirm the overly conservative nature of outdated FHWA design guidelines. A 1985 FHWA study found a stiff nylon TRM was capable of handling shear stress of 2 lb/ft<sup>2</sup> (96 Pa). This value was confirmed in a 1995 TTI study. As a result, SI feels that the FHWA guidelines should only apply to stiff nylon TRMs and not to Landlok TRM 450. For further details and design information, contact SI and request GPD-SM-204, GPD-SM-205 and EC-DESIGN® 2000, our erosion control design software.

## References

Chen, Y.H. and Cotton, B.A., "Design of Roadside Channels with Flexible Linings", Hydraulic Engineering Circular No. 15 (HEC-15), Federal Highway Administration, Publication No. FHWA-IP-87-7, McLean, VA, 1988.

Gordon, S., Personal letter from FHWA to Warren Cohn, Synthetic Industries, October 11, 1996.



Northcutt, P., "Final Performance Analysis - 1995 Evaluation Cycle: Class 1 - Slope Protection: Class 2 - Flexible Channel Liners", Texas Department of Transportation, February 1996.

Thibodeaux, K.G., "Performance of Flexible Ditch Linings", Contract No. DTFH61-84-Y-30019, Federal Hwy. Admin., McLean, VA, 1985.



Flow test at TTI's "real world" outdoor test flume.



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