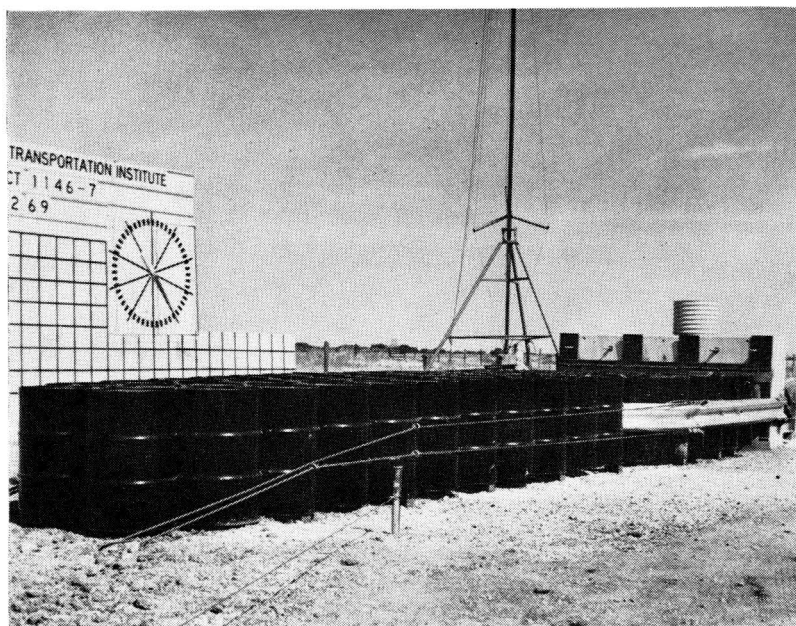


# SUMMARY REPORT 146-3(S)

## FLEXBEAM REDIRECTIONAL SYSTEM FOR THE MODULAR CRASH CUSHION

SUMMARY REPORT  
of  
Research Report Number 146-3  
Study 2-8-68-146



Cooperative Research Program of the  
Texas Transportation Institute and the Texas Highway Department  
In cooperation with the  
U. S. Department of Transportation, Federal Highway Administration

October, 1970

**TEXAS TRANSPORTATION INSTITUTE**  
Texas A&M University  
College Station, Texas

# **Flexbeam Redirectional System for the Modular Crash Cushion**

by

**Gordon G. Hayes, Don L. Ivey, and T. J. Hirsch**

The Modular Crash Cushion, through testing and field experience, has proven to be an effective impact attenuator between automobiles and rigid obstacles. While the Modular Crash Cushion design which is now in field use has proven to be highly successful, especially in head-on collisions, it does have a potential danger zone near the back of the cushion. When impacting in this danger zone, a vehicle can pocket and contact the rigid obstacle before losing a significant amount of energy. It is evident that, in this danger zone, redirection would normally be more desirable than complete arrestment. A modification, intended to produce the needed redirection capability in this danger zone, was evaluated by three vehicle crash tests.

The test results indicated that the inclusion of a W-section guardrail and additional steel drums around the rear portion of the crash cushion can provide redirection capability for angular crashes near the rigid obstacle if adequately supported by fixed posts and rigid cable connections. However, for angular hits directly in front of the guardrail portion, the vehicle will "pocket" and then encounter the guardrail at a severe angle. This tends to cause the vehicle to both spin and rebound. Nevertheless, the decelerations produced in such a test are not considered excessive for properly restrained passengers.

It was evident from the tests that the longitudinal cables attached to the flexbeam form an integral part of the flexbeam redirection system. These cables must provide lateral stability in angled impacts while producing negligible interference in head-on crashes. The last test reported here demonstrated the need for strong and rigid cable connectors, and several fixed posts supporting the guardrail.

Drawings of a revised design incorporating these features are presented in the report. It would be desirable to evaluate this revised design with a full-scale crash test.

The published version of this report may be obtained by addressing your request as follows:

R. L. Lewis, Chairman  
Research & Development Committee  
Texas Highway Department—File D-8  
11th and Brazos  
Austin, Texas 78701  
(Phone 512-475-2971)