



## Florida Department of Transportation Research

### In-Service Performance Evaluation (ISPE) for G4 (1S) Strong-Post W-Beam Guardrail and Median Cable Barrier

BDK80 977-19

The purpose of guardrail and median cable barrier is to prevent vehicles which leave the roadway from encountering life-threatening hazards, such as striking roadside obstacles or vehicles traveling in the opposite direction. In Florida, guardrail standards have been in place since the 1960s, but new guidance from the Federal Highway Administration based on changing make-up of the U.S. fleet resulted in an in-service performance evaluation of existing guardrail installations.

Florida Department of Transportation (FDOT) contracted Florida International University researchers to evaluate existing guardrail and median cable barrier on both limited and non-limited access roadways. The researchers used In-Service Performance Evaluation (ISPE) criteria, as described in National Cooperative Highway Research Program Report 22-13, tailored to project deliverables. For long-term management and maintenance, they recommended procedures and developed a system to collect guardrail inventory data.

Researchers selected road segments for evaluation using newly designed, Web-based applications: the Visual Roadway Inventory Collection System (VRICS) helps to access, collect, and verify FDOT's roadway characteristics data and identifies state roads with barrier systems of the type and with features evaluated in this study; and the Florida Guardrail Inventory (FGI), which for the first time collects and maintains guardrail inventory data on state roads. FGI is based on a review of guardrail inventory methods from other states and on a list of features desired for a Florida system. For guardrail, more than 40,700 police crash reports were examined; over 7,200 of these involved guardrail. For median cable barrier, about 8,800 police crash reports yielded over 540 reports.

Having identified methods and data, researchers based performance evaluations mainly on two types of analysis: (1) percentage of captured and crossover barrier crashes as a function of site



*W-beam guardrail (left) and median cable barrier (right) were found to be highly effective in reducing fatal crashes.*

location, vehicle type, crash severity, and median barrier lateral clearance; and (2) comparisons of crash experiences before and after barrier installation by vehicle type and crash severity.

Guardrail proved to be very effective, preventing about 95% of errant vehicles from crossing the median guardrail; the percentage was higher for passenger cars (97.5%) and lower for light trucks (91.6%). Rub-rail, the narrow strip of steel often seen below the guardrail beam, prevents about 95% of errant vehicles from crossing the median guardrail; moreover, rub-rail attachments helped prevent 98.3% of cross median crashes from clearing the median and traveling into the opposite direction of traffic.

For median cable barrier, the overall barrier effective rate in terms of preventing vehicles from traveling into the opposite direction of traffic was 97.4%. Equally significant were findings with regard to the reduction of fatal crashes: median cable barrier reduced fatal crash rate by 42.2%, incapacitating crash rate by 20.1%, and non-incapacitating crash rate by 11.6%.

This comprehensive study involved an in-depth analysis of the in-service performance of guardrail and median cable barrier that will result in a safer highway system in Florida.

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For more information, visit <http://www.dot.state.fl.us/research-center>