

Introduction

In February 2007, Governor Chris Gregoire requested that the Washington State Department of Transportation (WSDOT) and the Washington State Patrol conduct an independent review of cable median barriers following the fatal cross-median collision on Interstate 5 in Marysville on February 13, 2007. The evaluation included an examination of WSDOT's cable median barrier policy and statewide cable median barrier performance, and it made recommendations for WSDOT's research program.

WSDOT hired Malcolm Ray, PE, Ph.D., to conduct an independent evaluation, the results of which were set forth in the June 2007 "Cable Median Barrier Reassessment and Recommendations" report. That report included a recommendation for WSDOT to continue monitoring the performance of all cable median barriers.

This 2008 update provides another year of performance data for 135 miles of cable median barrier that were evaluated in the 2007 report, and includes data for the 43 miles of new cable median barrier that were installed during 2007.

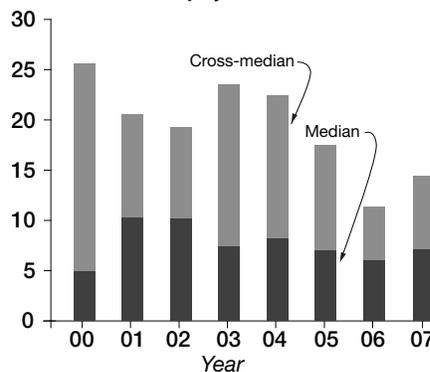
Dr. Ray was hired by WSDOT to review and comment on the 2008 update to the cable barrier performance report. His review comments are included in Appendix C of this report.

Cable barriers reduce deaths and serious-injury collisions: no significant change in results since the 2007 evaluation

Figure 0.1

Median and cross-median fatal and serious-injury collisions

Fatal and serious injury collisions



Source: WSDOT Transportation Data Office and Headquarters Design Office

With another 12 months of collision data, the general downward trend in high-severity collisions reported in the June 2007 report has remained constant. From 2006 to 2007, we have seen a slight increase in the number of median crossover incidents. This can be expected as more miles of cable barriers are added, since the risk of running into the cables increases with the number of miles that are in place.

Fatal and serious-injury collision rates have dropped significantly

WSDOT's cable barrier program has played a significant role in the reduction of fatal collisions along Washington State highways over the

last several years. Where WSDOT has installed cable barrier, the number of fatal and serious-injury collisions occurring in or across the median dropped from a rate of 24.8 annually to 9.5 annually after cable barrier was installed.

At the same time, the number of reported collisions has increased from 223 collisions per year to 561 per year because the barrier has been placed to intercept vehicles that leave the road. This report also examines the variation in collision rates for specific locations.

Comparing low-tension and high-tension cable

In this report, we compare low-tension and high-tension cable barrier systems. WSDOT has not installed any new low-tension cable barrier systems since 2005 and is instead using high-tension cable barrier. At the end of 2007, there were 43 miles of low-tension barrier in place and 134 miles of high-tension barrier. WSDOT uses high-tension barriers because they are easier to maintain. In addition, the increased tension keeps the cable taut even after some of the posts are knocked down. This increases the probability that the barrier will continue to offer some protection until repairs can be made. Only three percent of the reported collisions with high-tension cable barrier were cross-median events, compared to six percent for its low-tension predecessor.

Cable barrier is more effective in stopping vehicles in the median than concrete barrier

Keeping vehicles in the median is an important measurement of median barrier performance. Vehicles that cross the median or are redirected back into traffic have a greater probability of colliding with other vehicles. Cable barrier contained vehicles in the median 82.6 percent of the time, as compared with concrete barrier, which contained vehicles in the median 38 percent of the time.

No barrier can prevent injury and death in every crash

Many factors contribute to the survivability of a crash, and no barrier can contain every vehicle that runs off the road. Weather and roadway conditions, speed, impact angle, size and type of vehicle, influence of drugs and alcohol, attentiveness of the driver, use of seat belts, and other driver behavioral issues can all play a role in the outcome of an incident.

In 2007 there were five collisions reported in or across medians that resulted in six fatalities where cable median barrier is installed. Not all of these collisions involved the cable median barrier, and not all cross-median collisions resulted in a fatality. This report summarizes the factors involved in some of the most highly publicized collisions that occurred during 2007.

Washington's experience related to motorcycles colliding with cable barrier

Many motorcyclists have expressed concerns about cable barrier and motorcycle safety. There is a perception among motorcyclists that cable barrier isn't designed to protect them and could potentially cause harm if they hit the barrier.

This year's report examined motorcycle collision data from Washington State, from other states, and internationally. WSDOT has not found any verifiable data that supports the concern that cable barrier poses an increased risk for motorcyclists when compared to other barriers. This is an area that WSDOT will continue to actively research. A national study has been funded to look at the performance of highway barriers when struck by a motorcyclist.

Motorcyclists are relatively unprotected because they drive vehicles that don't have many of the safety features found in cars, such as seat belts and airbags. Consequently, the injury rate that occurs when motorcycles hit any

type of barrier is much higher than the rate when automobiles hit barrier. In most instances, this occurs because the deceleration forces in a collision are imparted directly on the rider, rather than absorbed by the vehicle and its restraint systems.

Update on the implementation of Dr. Ray's research recommendations and WSDOT's other research initiatives

We have provided an update in this report on our implementation of the recommendations made by Dr. Malcolm Ray in the 2007 report to Gov. Gregoire. In response to these recommendations, research is currently under way on methods to expand the effectiveness of cable barriers. One such effort is to modify the design of the cable connection hardware in existing low-tension systems. Other research efforts are focusing on larger vehicles and cable placement on slopes. Another research project is funded to examine motorcycle safety related to barrier systems.

As the level of experience with cable barrier systems has grown around the country, research institutions and product developers continue to refine designs to increase the performance of these systems. Thanks to WSDOT, manufacturers, the federal government, and other states' efforts, new systems that have been tested on a variety of slopes and terrains are in their final stages of development. Recent product development efforts have led to system modifications and new designs aimed at reducing the probability of vehicles going under or over the barrier. This report describes current research and our experience with cable barrier placement in the median and cable designs.

Project work planned for I-5 in Marysville

Dr. Ray's recommendations included installing concrete barrier for the section of I-5 in Marysville. This project was funded during the 2008 legislative session and will be advertised for construction in spring of 2009. From February 2007 to the printing of this report, there has not been a fatal or serious-injury cross-median collision in the Marysville area.

The use of cable barrier has been adopted nationwide

Cable barrier has been adopted for use in medians in almost every state in the country. This update describes where WSDOT should focus on expanding the use of cable median barrier on Washington's highways. It also describes how WSDOT will incorporate research to change policies to take advantage of the unique benefits of cable median barrier.