



Eliminating Cross-Median Fatalities

Statewide Installation of Median Cable Barrier in Missouri

BRIAN CHANDLER

The author is Traffic Safety Engineer, Missouri Department of Transportation, Jefferson City.

Missouri awarded the first contracts for highway construction under U.S. Interstate funding in 1956. The state boasts 17 Interstate highways, with Interstate 70 the most heavily traveled. I-70 is an east-west route connecting the state's two largest metropolitan areas, Kansas City and St. Louis. Construction of I-70 followed the standards of the day and has provided a safe and efficient freeway for 50 years.

Problem

The 1950s standards that applied to the original Interstate roadways now must reckon with 80,000-pound commercial vehicles and hundreds of thousands of vehicles traveling at 70 miles per hour.

Although the rural Interstate system is the safest in the nation in terms of crash rate, the high speeds and ever-increasing traffic volumes contribute to the loss of thousands of lives each year nationwide.

To combat this threat, safety professionals at the Missouri Department of Transportation (DOT) analyzed crash data to determine crash types and locations. A Missouri DOT internal report identified cross-median crashes on Interstates as a category to address, with hundreds of motorists endangered in the state each year.

Concern about cross-median crashes is increasing nationwide. Missouri researchers observed that as high-speed Interstate volumes increase, the likelihood of severe crashes also increases.



PHOTO: MISSOURI DOT

Cable median barrier prevented a truck from crossing a median into oncoming traffic.

Thirty years ago, a driver crossing the median had a good chance of crossing over the opposing lanes without conflict. Today, according to Missouri data, a motorist crossing the median is more likely to collide with another vehicle, and the chances are high that the opposing vehicle will be a large truck. Because several vehicles often are involved, traveling in opposite directions, the crashes cause multiple fatalities and disabling injuries.

Solution

In the 1980s, Missouri DOT undertook a research project and literature search to improve safety by preventing cross-median crashes. Studies by other states and an internal study led Missouri DOT to consider median cable barriers as a solution (1). Median cable barriers have been in use for many years and had come into use in Missouri as early as the 1980s at spot locations. For long-distance installation on rural Interstates, the cable barrier is a more cost-effective safety device than a concrete barrier or a guard rail.

After researching various options, Missouri decided to install a median cable barrier system on I-70 and on other Missouri Interstates. When the cable is struck, the posts yield and the cable deflects up to 12 feet, effectively catching and decelerating the vehicle and keeping it in the median. This effect gives cable an advantage over more rigid systems,

Posts of a cable median barrier are designed to break away when struck; as tread marks indicate, this cable barrier in Washington State prevented the vehicle from crossing the median.



PHOTO: WASHINGTON STATE DOT

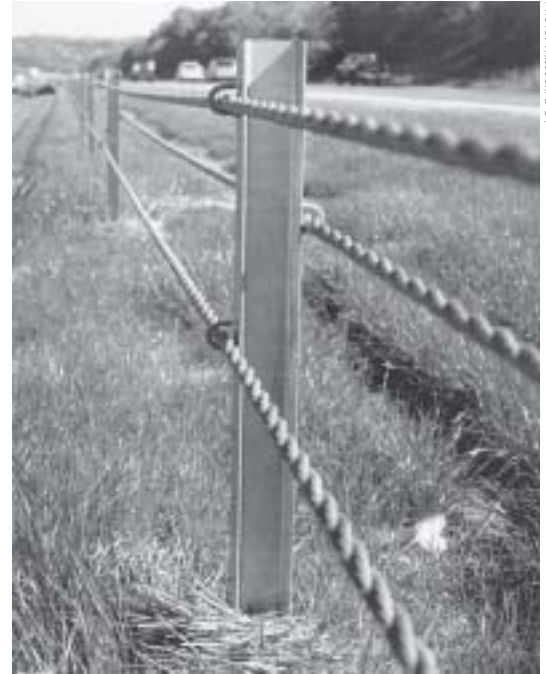


PHOTO: MISSOURI DOT

Closeup of guard cable median barrier installed on an Interstate median in Missouri.

because the vehicle is less likely to reenter the driving lanes after striking the barrier.

Applications

Early installations of median cable barrier in Missouri were limited to locations that had a history of cross-median crashes. Typically these sites were near interchanges. This strategy, however, was limited in effectiveness, because a significant number of cross-median crashes occurred at locations without cable barriers.

With this experience, metropolitan districts in Kansas City and St. Louis began continuous installation of cable barriers on high-volume segments of Interstates 44, 70, and 435. The success of these early installations led Missouri DOT to begin a systemwide installation of median cable barriers in 2002. Traffic engineers studied crash history statewide to determine the best strategic use of available safety funds. The decision was made to start the program on the Interstate system, to address the routes with the highest traffic volumes and the highest number of cross-median severe crashes.

Additional internal crash analysis by Missouri DOT showed that Interstates with medians that were less than 60 feet wide were overrepresented in cross-median crashes. The medians on Interstate 70, which links Kansas City and St. Louis, and on Interstate 44, which links Springfield and St. Louis, are predominantly 40 feet wide. Missouri DOT proceeded to install cable barriers on all Interstates

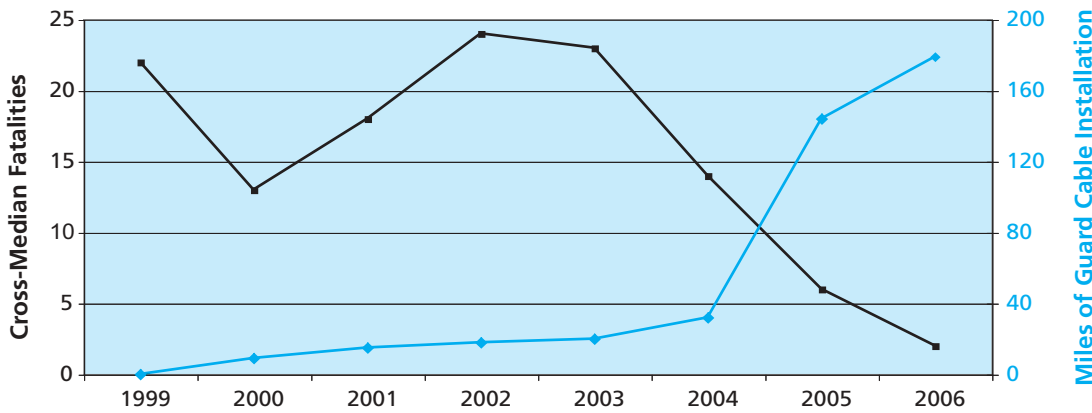


FIGURE 1 Cross-median fatalities on I-70 in Missouri declined as more miles of cable median barrier were installed. Table below shows data.

with median widths of less than 60 feet.

The installation of median cable barrier costs \$60,000 to \$100,000 per mile, depending on the amount of grading work required. After the cable is installed, the maintenance costs range from \$6,000 to \$10,000 per mile per year, depending on the frequency of hits.

With the improvements in safety from the median cable barriers on Interstate 70, Missouri has started installing the system on other Interstates with median widths less than 60 feet. The statewide installation of nearly 500 total miles of median cable barrier will be complete by the end of 2008.

Missouri DOT safety engineers will study other freeways and expressways to determine the effectiveness of additional cable barrier installations at locations that have wider medians and on non-Interstate routes.

Benefits

Median cable barriers have performed successfully in Missouri. An internal study determined that the cable catches 95 percent of vehicles entering the median and keeps the vehicles from entering the opposing lanes (2).

On Interstate 70, the number of cross-median fatalities had been increasing, reaching a peak of 24 motorists killed in 2002. The installation of 179 miles of median cable barrier on the freeway has nearly eliminated cross-median roadway deaths. In 2006, only two cross-median fatalities occurred on Interstate 70, a staggering 92 percent decrease. Missouri DOT is completing a study of property damage and personal injury related to vehicle crashes into median cable barriers.

The benefits of median cable barriers in Missouri were quickly apparent. The device has saved lives after a short period of use on Missouri's Interstates; cable barriers have proved to be a valuable safety engineering tool in reducing fatalities and serious injuries on the state's most heavily traveled roads.

Year	Miles Installed	Accumulative Miles Guard Cable Installed	Cross-Median Fatalities
1999	0	0	22
2000	9	9	13
2001	6	15	18
2002	3	18	24
2003	2	20	23
2004	12	32	14
2005	112	144	6
2006	35	179	2

For more information contact Brian Chandler, Missouri DOT, Traffic Division, P.O. Box 270, Jefferson City, MO 65102, phone 573-751-5678, fax 573-634-5977, e-mail Brian.Chandler@modot.mo.gov.

References

1. *An Analysis of 3-Strand Guard Cable Along Clay and Jackson Counties, Missouri*. Missouri Department of Transportation, Jefferson City.
2. *Study on Median Guard Cable Performance in Relation with Median Slope: Preliminary Results on I-44*. Missouri Department of Transportation, Jefferson City.

EDITOR'S NOTE: Appreciation is expressed to Peter Shaw and G. P. Jayaprakash, Transportation Research Board, for their efforts in developing this article.

Suggestions for "Research Pays Off" topics are welcome. Contact G. P. Jayaprakash, Transportation Research Board, Keck 488, 500 Fifth Street, NW, Washington, DC 20001 (phone 202-334-2952, e-mail gjayaprakash@nas.edu).