

Priority, Market-Ready Technologies and Innovations

Cable Median Barriers

New

Problem: An alternative to traditional concrete and metal-beam barriers is needed because these structures can be expensive and difficult to install

Median crossover crashes often result in fatalities or severe injuries to occupants of the errant vehicle and the motorists in the opposing traffic lanes. State departments of transportation (DOT) are interested in reducing median crossover crashes through the use of median barriers. The concrete and metal beam barriers traditionally used to prevent these crashes, however, are difficult to install on sloped terrain where their performance is often suboptimal. In addition, concrete and metal beam barriers are expensive, and State and local agencies often lack the resources to rapidly deploy these technologies to areas where vehicles frequently cross over the adjacent medians.



Left: A standard three-strand cable median barrier is shown. Below: A high-tension four-strand cable median barrier is shown.

Recent research shows that cable median barriers are more forgiving than traditional concrete and metal beam barriers and



can be effective when installed on sloping terrain. Collision forces are deflected laterally thereby reducing the forces transmitted to vehicle occupants.

Putting It in Perspective

Many States have collected data that demonstrate the significant impacts of cross-median crashes:

- Between 1990 and 1999, only 2.4 percent of all interstate crashes in Iowa were cross-median crashes, yet these crashes resulted in 32.7 percent of all interstate fatalities.
- From 1999 to 2000, more than 70 people in South Carolina lost their lives in 57 separate interstate crossover median crashes.
- North Carolina DOT has found cross-median crashes to be three times more deadly than other freeway crashes. Cross-median barriers are expected to lead to an estimated 90 percent reduction in these types of collisions.

Solution: Promote the accelerated deployment of cable median barriers

As an alternative to concrete and metal beam barriers, some States are turning to cable median barriers in areas where there is sufficient median width and a high potential for crashes.

Although cable barriers have been used since the 1960s, it was not until the 1980s that some State DOTs started using a modified cable rail as a median barrier. Today, many States, including Arizona, Colorado, North Carolina, Ohio, Oklahoma, Oregon, South Carolina, Utah, and Washington State, are installing cable barriers in medians originally built without barriers. New data suggest that cable median barriers are an effective

mechanism for preventing fatal and disabling crashes. In Washington, for example, annual cross-median fatal crashes declined from 3.00 to 0.33 fatalities per 100-million miles of vehicle travel, while annual disabling accidents went from 3.60 to 1.76. The overall benefits of cable median barriers were calculated to be \$420,000 per mile annually.

While cable median barriers have low installation costs, they can be costly to repair after a crash. In addition, when several posts are hit during a single crash, the cable barrier may then be vulnerable to crossovers until the damaged section is repaired. Rapid maintenance can be difficult, especially during winter months. Several proprietary high-tension cable designs are now available, however, that can withstand multiple hits.

Successful applications: Using cable barrier systems to meet local needs

The North Carolina and Oregon DOTs completed detailed in-service evaluation reports of cable barrier systems and found that the systems were nearly 100 percent effective in preventing deadly crossover crashes on freeways. Cable median barriers have been successful in South Carolina, where three-strand cable systems were installed in areas with multiple median crossover crashes. From August 2000 through July 2003, the South Carolina cable median system was hit 3,000 times, but only 15 vehicles penetrated the cables. In addition, Oklahoma and several other State DOTs recently installed proprietary cable barrier systems with reported success.

Benefits

- Cable median barriers are an effective means of reducing fatal crossover crashes.
- Sufficient cost efficiencies can be achieved through the introduction of higher-tension cable systems.
- Financial resources can be saved if crews at State DOTs develop the skills to rapidly repair cable median barriers.

Some motorcyclists have expressed concerns over cable barriers. Researchers in the United Kingdom, however, found little difference between crashes into cable median barriers and other barrier types. According to the data, most riders are separated from their motorcycles soon after leaving the pavement and are sliding on the ground by the time they reached the barrier. The data also did not show that cable barriers cause extraordinary injuries.

Deployment Statement

The increased use of cable barriers in relatively wide medians where a barrier is warranted will

decrease the number of severe cross-median crashes. Cable barriers are cost effective because they are relatively inexpensive compared to other types of barriers. They also perform better than other barriers when installed on the moderately sloping terrain common to many existing medians.

Deployment Goal

The goal is for every State to review its median crossover crash history to identify locations where cable median barriers may be warranted and to implement appropriate construction projects that use cable median barriers.

Deployment Status

Many State DOTs have independently assessed the extent of their median crossover problem and have modified the barrier warrants established in the late 1970s. Most of these States also have installed a significant number of cable barriers, including both the generic, lower-tension design and high-tension patented cable barriers. The American Association of State Highway and Transportation Officials (AASHTO) is modifying its median barrier warranting criteria to reflect current trends, an action that will lead to the installation of additional median barriers in many States.

Additional Resources

Guidelines for median barrier warrants, selection, and installation are contained in AASHTO's 2002 *Roadside Design Guide*. Information on crash-tested cable barriers can be found at <http://safety.fhwa.dot.gov/report350hardware> under Longitudinal Barriers, using the keywords, "Cable Barriers." To learn more about AASHTO-TIG's approved technologies, visit <http://tig.transportation.org>.

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