Tech Brief

November 2017

Maintenance of High Tension Cable Barrier

CATEGORY: Maintenance

ISSUE: High tension cable barrier (HTCB) has proven effectively to reduce the frequency and severity of median crossover crashes. Currently, only approved propriety systems are eligible for Federal funding by the FHWA. The systems below meet all full-scale crash testing conducted under NCHRP Report 350 or AASHTO MASH 09 guidelines and are on ADOT Approve Product List (APL).

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Like all barriers, it is important to properly design, install, and maintain HTCB for the best performance. To function properly in an impact, a HTCB must be able to gradually redirect or arrest an impacting vehicle by cable deflection, which minimizes forces on the vehicle and its occupants. To obtain the desired results, the cables must be properly tensioned and and at the correct heights above the ground.

OBJECTIVE: To provide ADOT maintenance personnel with general guidance regarding maintenance and repair of high-tension cable barrier systems. Maintenance can be divided into two areas—routine maintenance and repairs after crashes. For maintenance and repair procedures for specific systems, personnel should receive manufacturer-based training and keep on-hand and use the manufacturer's installation and repair manual.

METHODOLOGY: After striking a high-tension cable barrier, a motorist is oftentimes able to drive away from the crash scene, leaving no documentation, such as a police crash report. Therefore it is important to have frequent field inspections by maintenance and other personnel to identify damaged locations and to aid in timely repairs to maintain optimal performance. This would include both drive-by assessments for obvious impact damage as well as checking cable tension.

ADOT Infrastructure Delivery and Operations
ARTBA American Road & Transportation Builders Association
KLS Engineering
U.S. Department of Transportation Federal Highway Administration

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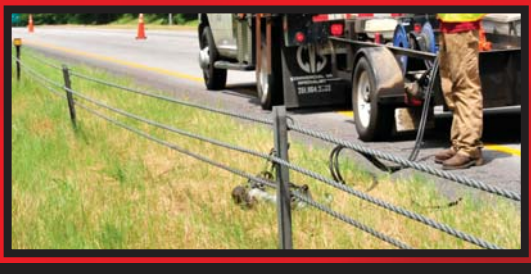

EXPECTED RESULTS:

To Provide ADOT repair personnel charged with repair and maintenance of HTCB with guidance on appropriate repair and maintenance of HTCB.

Cable Inspections: It is important that crews routinely check tension, even in the absence of an impact (photograph A), as per manufacturers' recommendations. This is particularly important during the first few years following cable installation. Cables can lose tension because of construction stretch, temperature changes, anchor creep, fitting slippage, and/or previous impacts elsewhere in the same run of HTCB. Maintenance personnel should also check the tension and inspect the individual cables for kinks or broken strands as part of routine maintenance (at least annually), and also following any repair, in accordance with manufacturer guidelines.

In situations where there is an impact and the vehicle becomes tangled in the cable (photograph B), it is important to keep the cable intact. In many situations, the vehicle can be removed by pulling it in the opposite direction from which it hit the system. Maintenance personnel (as well as emergency responders) should consider cutting the cables only under life-threating situations and other alternatives for loosening the cables are not feasible Alternatives to cutting the cable include:

- Loosen cables at the turnbuckles.
- Cut a turnbuckle rather than a cable. This alternative requires removing the adjacent posts on either side of the turnbuckle.

Note: Before cutting a turnbuckle, ensure all personnel are clear of the cable. Cut the center of the turnbuckle between two undamaged posts away from the impact area. Contact manufacturers for any specific considerations for their particular system.

Posts Inspections: Posts can be installed in cast-in-place concrete sockets, precast concrete sockets, or with driven posts. Systems installed using socketed posts, possibly in conjunction with a continuous mow strip, will facilitate removal and replacement of damaged posts. In most impacts, only the posts are typically damaged (photograph C). If enough posts have been hit or if the damaged section is along a roadway curve, the cables may be on the ground (photograph D) and maintenance personnel should expedite repairs to ensure a fully effective barrier. Damaged posts can present a spearing hazard should a secondary impact occur; crews should remove damaged or bent-over posts to eliminate the spearing potential and appropriately delineate the area to warn the motorist as soon as practical after the discovery/notification of the impact. Complete repairs in a timely manner to maintain the systems optimal performance. It is recommended that a District maintain a supply of posts for the high-tension cable barrier systems used in the district for use as needed.

Anchorage Inspections: Anchorage designs for high-tension cable barrier are unique in that impact to an anchor releases tension in long sections of barrier, making it ineffective. For this reason, locate anchors in areas where they are least likely to be struck. Offsetting the downstream and upstream anchors at a median crossover or introducing an anchor near the downstream end of a bridge rail can minimize terminal impacts. Some terminal designs anchor each cable separately (photograph E), so tension is retained in some cables when only one anchor post is released. However, most designs use a single anchor point and all tension is lost upon impact. Therefore, repair of the anchorage and resetting the cable should be a high priority.

A

B

C

D

E