Alberta Government

Motorcyclists and High Tension Cable Barrier (HTCB)

General Mitigation Strategies for Roadside Hazards

There are several mitigation strategies for the treatment of roadside hazards. Mitigation measures or options include the following:

- remove the hazard;
- redesign the hazard so it can be safety contacted;
- relocate the hazard to reduce the probability of it being contacted;
- reduce the severity of the hazard;
- shield the hazard (install a barrier system);
- delineate and increase the driver's awareness of the hazard.

Shielding a Hazard by Installing a Barrier System

The purpose of a barrier system is to reduce the severity of a collision for vehicles in run-off-road crashes. If a barrier system can reduce the number of run-off-road collisions also, then this is a bonus.

Everything we do in Alberta Transportation is done with the "Safe System" approach; an international best practice to encourage safe road users travelling at safe speeds, in safe vehicles, on safe infrastructure. Where barriers are warranted, our practice is to select the safest and most forgiving barrier system that will provide the required protection for the site-specific conditions. The practice is intended to minimize severity of injuries and reduce fatalities sustained during traffic crashes.

High Tension Cable Barrier (HTCB) is currently the most forgiving system and has been the preferred barrier option in Alberta since 2012. HTCB has become the standard to replace traditional concrete and steel barriers except in situations where HTCB cannot be used, such as on bridges and small-radius curves.

Benefits of High Tension Cable Barrier

HTCB is a flexible barrier and is superior to traditional guardrail barrier for reducing the severity of a collision and reducing the number of run-off-road collisions. Conventional barrier systems (such as concrete or steel) are more rigid. Impact with these barriers exerts a greater force on a vehicle when contact is made. Impact with a flexible barrier is a "soft" impact. The HTCB barrier deflects significantly and absorbs most of the kinetic energy in a crash, thus reducing the deceleration experienced by vehicle occupants and, therefore, reducing collision severity (fatalities and injuries). Conventional barriers also present the possibility of a crash with the end treatment that can be more severe than a similar impact with a HTCB end treatment. HTCB does not cause snow drifting in the same way that traditional barriers do. Snow drifts can impact visibility and winter driving conditions. Fewer snow drifts result in a reduction of the occurrence of run-off-road incidents as well as the maintenance costs related to snow clearing.

HTCB generally has many other advantages over other types of barrier systems, including:

- Reduced damage to vehicles;
- Cost to install and maintain is generally less than concrete and steel barrier systems;
- If impacted, relatively fast and easy to repair;
- Often continues to provide protection after impact and prior to repair. The tension keeps the cable near the design height even when the posts are damaged and or have broken off;
- Improved sight distance where conventional barrier would block the line of sight;

Barrier Type and Risk to Motorcyclists

A conventional barrier typically requires many more posts than HTCB. These posts present a great risk to a driver of a motorcycle in a collision. Reducing the number of posts by using HTCB makes our highways safer for all vehicles.

Many research studies have been conducted to examine the effects of motorcycle crashes, and the safety of motorcycle riders, into various forms of roadside barriers. The risk of a fatal or serious injury is very high for a motorcyclist crashing into a roadside barrier, regardless of the barrier type. There is no evidence that HTCB is more harmful to motorcyclists than other barrier types.

Following are some findings from various research studies:

- A rider "impacting a crash barrier is at a very high risk of a fatal injury, regardless of whether the barrier is concrete, steel or wire rope." (Ref 1)
- "Although some concern has been expressed regarding the use of flexible barriers and its potential to cause injury to motorcyclists who impact with them, no evidence exists to indicate that riders who leave the roadway will be at greater risk of injury striking a flexible barrier than if there were either no barriers or barriers of a different type." (Ref 2)
- "Overall, the research notes that whilst WRSBs [Wire Rope Safety Barriers] have the potential to cause serious injury to errant riders, so do all road safety barriers." (Ref 3)
- ". . . there is no reliable evidence to indicate that wire rope barriers present a greater or less risk [to motorcyclists] than other barrier types, or indeed, no barrier at all." (Ref 4)
- A study by Daniello and Gabler (Ref 5) was carried out, "to determine the influence of barrier design on serious- and fatal-injury risk in motorcycle–barrier crashes. A specific objective was to determine whether collisions with cable barriers carried a higher risk than collisions with W-beam guardrails or concrete barriers."
  "This study analyzed 951 motorcycle–barrier crashes involving 1,047 riders from 2003 to 2008 in North Carolina, Texas, and New Jersey to determine the effect of barrier type on injury severity in crashes."
  "Motorcycle collisions with barriers have been shown to be much more severe than other vehicle collisions with barriers. The impact of barrier type on injury severity for motorcyclists has been greatly debated. . . . to date no definitive evidence has shown that cable barriers are indeed more harmful to motorcyclists than other barrier types."
- "The researchers reviewed collisions involving motorcycles hitting median barrier and found no significant difference in injury severity regardless of what type of median barrier motorcyclists struck." (Ref 6)

References

Ref 1
*"Overview of Motorcycle Crash Fatalities Involving Road Safety Barriers", b*y R. Grzebieta, H. Jama, A. McIntosh, R. Friswell, J. Favand, M. Attard and R. Smith
Journal of the Australasian College of Road Safety, November 2009

Ref 2
"Flexible Barrier Systems Along High-Speed Roads: A Lifesaving Opportunity", by Magnus Larsson, Mimmi Candappa and Bruce Corben
MONASH University Accident Research Centre, December 2003

Ref 3
"Motorcyclists and Wire Rope Barriers", by Tim Selby
Opus International Consultants Limited, November 2006

Ref 4
"Motorcyclist Injury Risk with Flexible Wire Rope Barriers and Potential Mitigating Measures", by Christine Mulvihill and Bruce Corben
MONASH University Accident Research Centre, September 2004

Ref 5
"Effect of Barrier Type on Injury Severity in Motorcycle-to-Barrier Collisions in North Carolina, Texas, and New Jersey", by Allison Daniello and Hampton C. Gabler
Transportation Research Record: Journal of the Transportation Research Board, No. 2262, Transportation Research Board of the National Academies, Washington, D.C., 2011, pp. 144–151.

Ref 6
"*Cable Median Barrier Program in Washington State*", by Dave Olson, Mark Sujka and Brad Manchas
Washington State Department of Transportation, June 2013