HIGH TENSION CABLE BARRIER

Vehicle extrication tips for Emergency Responders

Since 2004, the Minnesota Department of Transportation (MnDOT) has been installing high tension cable barrier on Minnesota highways. The cable barrier is an effective safety measure in reducing cross-median, head-on, crashes which are some of the most serious and deadly.

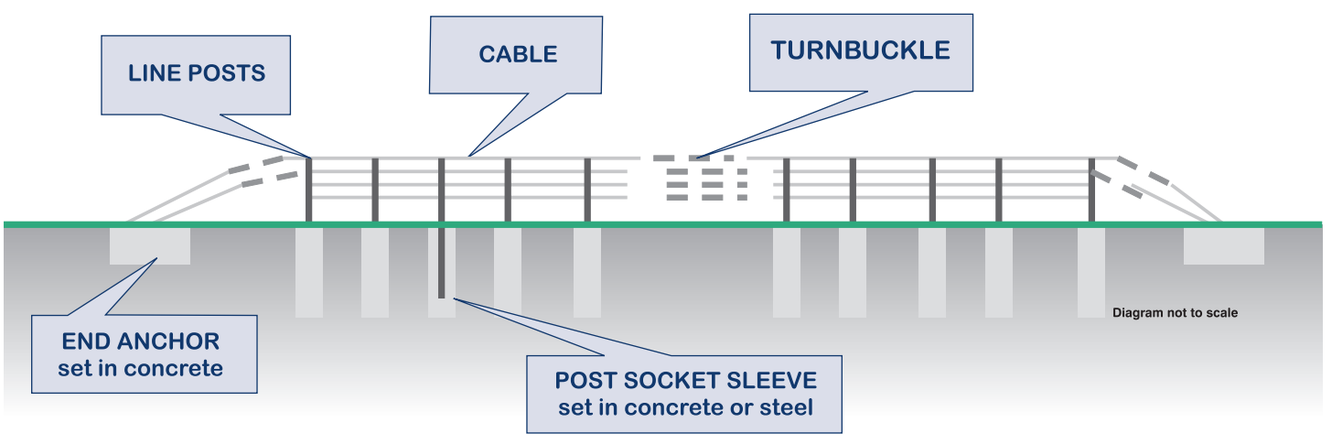
Emergency responders need to be aware of critical safety tips when responding to incidents involving the high tension cable barrier and how best to safely extricate vehicles entangled in the cable. Keep in mind, this pamphlet is a brief overview and is not designed to take the place of formal classroom training.

Minnesota has several different cable barrier systems, including those manufactured by Gibraltar, Brifen, and Trinity. While each of these systems has some unique characteristics, the fundamental design elements are the same.

Cable Guardrail Basics

- The cable barrier is normally under between 3,000 to 8,000 pounds of tension. Tension can change significantly depending on ambient temperature.
- Hotter temperatures = lower (looser) tension level
- Colder temperatures = higher (tighter) tension level

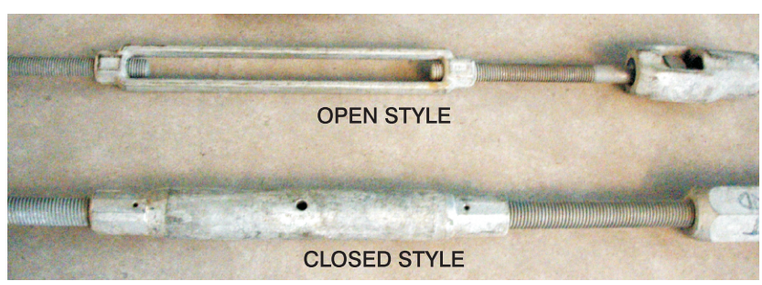
The cable barrier system is designed to absorb some of the energy from a vehicle crash. The cable posts will shear off, lowering the cable tension in the area of the impact. In most cases, responders should not have any difficulty with vehicle extrication. In rare instances, vehicles have become entangled in the cable, requiring additional extrication steps. Keep in mind that tension can be much higher if the cable is being pulled out of alignment or has the weight of a vehicle resting on it.



Above ground

Cable – 3 or 4 pre-stretched ¾ inch thick multi-strand steel ropes

Turnbuckle – Are typically spaced every 1000 feet and at each anchor point. They are used to adjust the cable tension, connect cable runs, and to connect to the end anchor points. They can be open or closed style. *(See picture)*



Line Posts – One quarter-inch thick plate steel posts. Typically about 52 inches tall, with 16 inches underground fit in the socket sleeve with the remainder above ground. Posts hold the cable up, maintain system tension, and absorb some of the energy in a crash impact through friction on the cable and by shearing off.

Below ground

Socket sleeve – Holds the line posts in place. Can be cement or driven steel socket.

End Anchor – A large concrete block to anchor the cable.

Vehicle Emergency Extrication Strategies

Important - Cutting the actual cables should only be considered under life or death situations where other alternatives for loosening cables are not feasible. The cable cannot be re-spliced if it is cut, it must be replaced. If that occurs, the system will be out of service and not providing protection to motorists for potentially a long period.

Always use caution when working with the cable system. Look around your scene and determine what forces are involved, where the cable is being pulled and where it will go when released, and if any additional weight is resting on it, and keep response personnel and civilians clear.

Notify MnDOT via State Patrol Dispatch that you have an issue with vehicle or patient extrication from the cable barrier system. Request a time estimate for MnDOT response and use that to assist in your choices.

Manipulate the vehicle.

Preferred option - No additional damage to cable barrier system

Move the vehicle back to center line with the cable system. If the cable is under tension because the vehicle has pulled it out of line, use tow/recovery equipment to push, pull, or drag the vehicle back. Carefully release air and remove tires or other car parts that are hung up on the cable.

Remove or cut the turnbuckle.

Cable can be repaired by MnDOT personnel.

Identify the cable(s) preventing extrication and follow them back to the closest turnbuckle. Remember, turnbuckles are spaced about every 1000 feet; so they should be **no more** than 500 feet up or down stream from the incident location. Using a reciprocal or circular saw cut down the center of the turnbuckle, away from the screws. If no cutting tools are available, two pipe wrenches may be used to carefully unscrew the turnbuckle. Stand perpendicular to the cable and as far back as possible. Use extreme caution and be aware that the cable will retract with great force when cut or unscrewed.

Cut the cable.

Not easily repairable and the cable system will be out of service for extended period.

As a last resort, if no other options are possible, and if victim rescue requires immediate extrication, the cable can be cut. If available, wrap both sides of the cable with duct tape to reduce unraveling that could injure responders. A hydraulic cutting tool may be used, but evidence indicates that slowly cutting the strands with a circular or reciprocal saw will allow a more gradual release of tension. Make the cut to the cable from a position with at least 10 undamaged line posts separating it from the extrication scene. A series of undamaged posts will assist in moderating retraction and reducing whipping effect when the cable is cut.

Important notes for the next steps...

- Wear all personal protective equipment including face shield and heavy gloves
- Only take down the minimum cables needed to extricate the vehicle.
- Clear personnel away from cable, including at the incident scene.
- Notify MnDOT via State Patrol Dispatch that the cable has been taken down.

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