

ALL TANGLED UP

HOW TO EXTRICATE A VEHICLE FROM A HIGH-TENSION CABLE BARRIER



HIGH-TENSION CABLE BARRIER SYSTEMS ARE SAVING LIVES

High-tension cable barrier systems are a safety feature being added to select stretches of Iowa highways where there is a higher occurrence of median crossover crashes. The barriers are designed to reduce median crossover crashes by keeping errant vehicles on their own side of the road.

When vehicles have become entangled in the cables, emergency service providers have asked: *What do we do if there are life-threatening injuries and we can't get to the victims because of the cables? Can the cables be safely cut to save lives?*

The answer is yes, but cutting the cables should be a last resort. There are other options for extrication that allow the cables to remain intact and continue to save other lives. When high-tension cable barriers are cut, thousands of feet of barrier could be placed out of service until repairs can be made.

BARRIER SYSTEM ELEMENTS

High-tension cable barrier systems used in Iowa have either three or four cables. Each cable is held in constant tension in the range of 3,000 to 8,000 pounds, depending on ambient temperature and seasonal changes.



Although several different high-tension cable barrier types exist, they all use the same cable that consists of 3/8-inch-diameter galvanized steel cable with 3-by-7 construction (21 wires).

Depending on the type of system, the cables may be attached to the weak steel posts using special locking hook bolts or threaded through the posts. The barrier is installed using concrete footings in which metal tubes are cast to form sockets for the posts. After

impact, any damaged posts can be removed from the sockets and replaced with new posts.

Turnbuckles are used to achieve the appropriate tension in the system. Turnbuckles are generally installed every 1,000 feet or at lesser distances (as little as 200 feet), if required.

KEEP THE CABLES INTACT AND RELEASE TENSION

If a vehicle becomes entangled in the cable, the first instinct of emergency responders is to cut the cable to gain better access to the victims. However, there are better options and cutting the cables should be a last resort using extreme caution and proper procedures. *The alternatives to cutting the cable are listed here in order of preference.*

- 1** If satisfactory extrication time exists, Iowa Department of Transportation maintenance personnel are trained to safely add slack to cables by taking out posts and loosening turnbuckles. To seek Iowa DOT assistance during an emergency, contact the Iowa DOT's Operations Support Center 24/7 at 515-237-3330.
- 2** Reduce the tension in the system by moving the cables back to their original positions in line with the posts. This can be accomplished by driving, pushing, or pulling the vehicle back in the opposite manner that it entered the cable system.
- 3** Add slack to the cables using one of the following four methods.
 1. Lift the cables out of and/or off the posts approximately 100 feet upstream and downstream of the vehicle. A span of approximately 100 feet without any posts will allow the cables to lie on the ground.
 2. Remove the posts from their sockets approximately 100 feet upstream and downstream of the vehicle. If the cables are under extreme tension, use extra caution and secure the post with a chain or restraining device during removal.



- Tension in the cables can also be released at the nearest upstream and downstream turnbuckles or at one of the cable end anchors, whichever is closest. Use hand tools to loosen the turnbuckle until the end of each threaded terminal reaches the inspection hole.

SAFETY WARNING: The threaded terminals should always remain visible in the inspection holes. Unscrewing the turnbuckle or cable anchor end beyond this point can be unsafe. The cables could release rapidly as the threads strip out of the connection.

- Cut off pieces of the vehicle.

SAFETY WARNING: Cables may release from the vehicle uncontrollably and without warning. When making the cut, make sure NOT to stand in the area between the vehicle and the normal location of the cables within the posts.

- Knock down the end anchor. Most end anchors are designed to act as a lever to lift cables out of their anchor slots. The preferred method for these designs is to approach the end anchor with the front bumper of a vehicle at idle speed and knock over the vertical post. For designs without a vertical post, an extended crowbar is used to lift cables out of their anchor slots.

SAFETY WARNING: Approach and release the end anchors on the side opposite of the cables. Do not stand to the side or in front of the end anchor when knocking it over. When released, the cable ends will travel at high speeds until the tension is released and have the potential to cause injury to anyone on the side or immediately downstream of the end anchor.

- The final option, preferred to cutting the cable, is cutting a turnbuckle. It is much easier and less costly to replace a turnbuckle than it is to install a cable splice or to replace a section of cable. Before cutting a turnbuckle, remove the adjacent posts in the vicinity of the turnbuckle, if possible.



Always cut in the middle of the turnbuckle. Make the cut several hundred feet from the vehicle, midway between two undamaged posts where the cables are parallel and not being subjected to multiple forces.

Cut only the minimum number of turnbuckles necessary to remove the vehicle. Make the cut standing perpendicular to the system, arms in front. Use either an abrasive blade cutoff saw or hydraulic cutters. Use gloves and safety goggles, and cut very carefully.

SAFETY WARNING: Although the cable should move only a short distance in each direction after the turnbuckle is cut, everyone except the person making the cut should stand a safe distance clear of the cable. High-tension cables are under thousands of pounds of tension, and a vehicle trapped in the system creates even higher tension forces. Therefore, cutting a turnbuckle has the potential to cause injury.

CUT THE CABLES AS A LAST RESORT

Although it can be done, cutting cables under tension should be done with caution and only as a last resort where a life-threatening situation exists, time is critical, and other alternatives for loosening the cables are not feasible. Cutting cables will require a cable splice or complete cable section replacement, which is time consuming and costly. It also disables a section of the system.

If the cable must be cut, cut only the minimum number of cables necessary. Make the cut several hundred feet from the vehicle, midway between two undamaged posts where the cables are parallel and not being subjected to multiple forces.

The cable should be securely taped with duct tape on each side near where the cable will be cut to prevent unraveling. Make the cut standing perpendicular to the system, arms in front. Use either an abrasive blade cutoff saw or hydraulic cutters. Use gloves and safety goggles, and cut very carefully. Pay particular attention when there are only a few strands remaining during the final stage of cutting.

SAFETY WARNING: Although the cable should move only a short distance in each direction, everyone except the person making the cut should stand a safe distance clear of the cable. High-tension cables are under thousands of pounds of tension, and a vehicle trapped in the system creates even higher tension forces. Therefore, cutting a cable has the potential to cause injury.

NEED CRASH SCENE EXTRICATION ASSISTANCE?

Iowa DOT maintenance personnel can provide guidance and on-site help at a crash scene 24/7. During an emergency, contact the Iowa DOT's Operations Support Center at 515-237-3300 or Iowa State Patrol through their dispatch center.

Call this number to also report a damaged or cut cable system following a crash.

MORE INFORMATION

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