

Close call when spliced eye on tether cable breaks

Incident

In August 2017, the operator of a cable-assisted steep slope machine (SSM) had a close call when the spliced eye on his cable broke while traveling downhill.

The spliced eye had been inspected that morning and had two broken crown wires, but that is not where the break occurred.

The base machine communicates information about cable tension with the SSM through a computer system. The operator receives information about cable tension from a computer screen located on the front wall of the cab on the lower left-hand side. If the system is not working correctly, the tension monitor will read “over tension”, causing the computer screen to flash a warning and an audible alarm to sound. If the signal is lost between the two machines, a light attached to the back wall of the cab behind the operator will change from green to red.

The machine’s computer system had recently been reprogrammed by the manufacturer. The operator did not have the passcode required for reprogramming. After reprogramming, the tension monitor was working correctly, except for the audible alarm. On the day of the incident, the operator knew that the communication was not working correctly between the base machine and the SSM.

The operator was traveling down a 90% slope to begin cutting. He focused his attention on the direction of travel, not the tension monitor. The operator did not see the screen flashing a tension warning, and no audible alarm sounded. The signal was also lost between the machines, causing the base machine to automatically stop releasing line and to put on the brake for the drum. The operator continued going downhill pulling line from the drum and increasing the tension placed on the line.

He heard a loud bang and began to slide downhill. Since he was traveling downhill, his boom was in front of him. It began curling under the machine as he slid approximately 40 feet. Due to his experience, he remained calm and was eventually able to get his boom angled off to the side and against a stump to stop the machine. The base machine only moved approximately a foot and did not trigger the breakaway switch.

The operator was uninjured, and gained some key safety knowledge through the near miss that his company is now utilizing. The operator stated that the system was safe and it was put back to work that day. Readings from the base machine showed that the line had been over-tensioned 16 times up to 86,000 pounds during the incident. The system is designed at a 3:1 safety factor. The breaking strength of the 1-inch swaged line with a spliced eye is approximately 98,400 pounds, and the recommended maximum tension is 44,000 pounds.



Broken spliced eye

Contributing Factors

- Audible alarm on the tension monitor was not functioning.
- Communication between the two machines was not properly functioning.
- Loose terminals on the base machine sensor. The operator knew that terminals on the base machine often come loose after moving it. The previous day he had moved it over a mile down the road and did not check to see if they had come loose.



Recommendations

- Inspect all safety features and ensure they are working prior to operation.
- If any safety feature is not operable, stop work until repaired. *After this incident, the manufacturer installed audible alarms that sound if safety systems are not functioning when the machine is started.*
- Install mechanisms that will not allow operation if safety systems are not working properly, or when set safety parameters are exceeded.
- Steep slope machines should have a secondary stopping device.
- Only allow trained, experienced operators to run steep slope machines.
- Place visual safety alarms within operator line of sight.

Position of safety features in cab:

1. Signal sensor (behind operator).
2. Tension monitor screen. During the incident, the screen was flashing a warning, but no audible alarm sounded.
3. Video screen for camera facing up showing trees being felled.
4. Video screen for camera showing base machine drum.

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