Incident Summary #II-1398130-2022 (#28515) (FINAL)

SUPPORTING INFORMATION	Incident Date		May 12, 2022
	Location		Interior
	Regulated industry sector		Passenger ropeways - Above surface ropeway
	Impact – Injury	Qty injuries	0
		Injury description	N/A
		Injury rating	None
	Impact – Damage	Damage description	Protruding/broken wires on counterweight tension rope, broken roller at front of tension system carriage, and broken carriage limit switch at front stop.
		Damage rating	Minor
	Incident rating		Minor
	Incident overview		Maintenance personnel lost control of ropeway tension system winch while de-tensioning ropeway.
INVESTIGATION CONCLUSIONS	Site, system and components		Chairlift utilizes a gravity counterweight tension system to achieve the required tension within the haul rope (Image). Steel plates combined make up the counterweight, which is suspended by the tension rope connected to a travelling carriage such that it applies the required force onto the haul rope. The carriage consists of the bottom bullwheel, which is the main drive sheave and redirects the haul rope 180 degrees from downhill to uphill haul rope travel. The carriage moves on a set of rails until there is a balance between the tension in the haul rope and the suspended counterweight. The tension rope is connected to a winch for positioning the counterweight. A worm-gear winch is equipped with safety cogs on a ratchet and friction plates to automatically hold the load.
	Failure scenario(s)		Equipment being utilized by workers for winch operation became disconnected, and the stop cogs on the winch ratchet disengaged allowing for the winch to unwind the tension system rope uncontrollably; until the counterweight bottomed out and the carriage was stopped by the rails front limits.
			Ropeway data: • Originally built in the late 1970's. • Re-located to its existing location in 1999. • Tension system at bottom (load) station. • Gravity Counter-weight tension system. Observed by Safety Officer: • Protruding/broken wires in tension rope. • Broken roller on tension carriage.

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Facts and evidence	• Carriage limit switch and bracket damaged. • Maintenance personnel have minimal ropeway experience and support. • Personnel unaware of tension winch Safety Bulletins issued by manufacturer. <u>As reported by duty holder</u>: • Personnel were uncertain of tension winch operation. • No procedure was available for personnel. • Ropeway Maintenance manual is limited. • The stop cog for winch ratchet was disengaged. • Maintenance personnel installed a gear mechanism, chain and power drill to operate the tension system winch. • Power equipment became disconnected when the chain fell off that was operating the winch. • The tension system rope began to unwind uncontrollably. • The counterweight released to the ground. • Carriage travelled uphill along rails, 2 meters, in an abandoned manner. • Carriage movement was halted by rail front mechanical stops. <u>Manufacturer Winch Bulletin</u> • Ensure all ratchet cogs are freely moving and properly retained. • Ensure all cog tension springs are intact and applying sufficient pressure to maintain contact with the ratchet wheel. • It is not acceptable to use power equipment to lower the counterweight any faster than it can be done by hand. <u>CSA Z98 requirements</u>: • Owner/representative shall be responsible for training maintenance personnel. • Maintenance manual, service and safety instruction bulletins shall be available to appropriate personnel. • Written safety procedures for safe rigging shall be prepared and available in place.
Causes and contributing factors	Maintenance personnel unsure of the tension system winch operation certainly caused the ropeway tension system, carriage, and counterweight, to move uncontrollably causing damage to the tension system rope, carriage roller and rail limit switch. A lack of maintenance experience and written procedure for maintenance personnel likely contributed the incident.

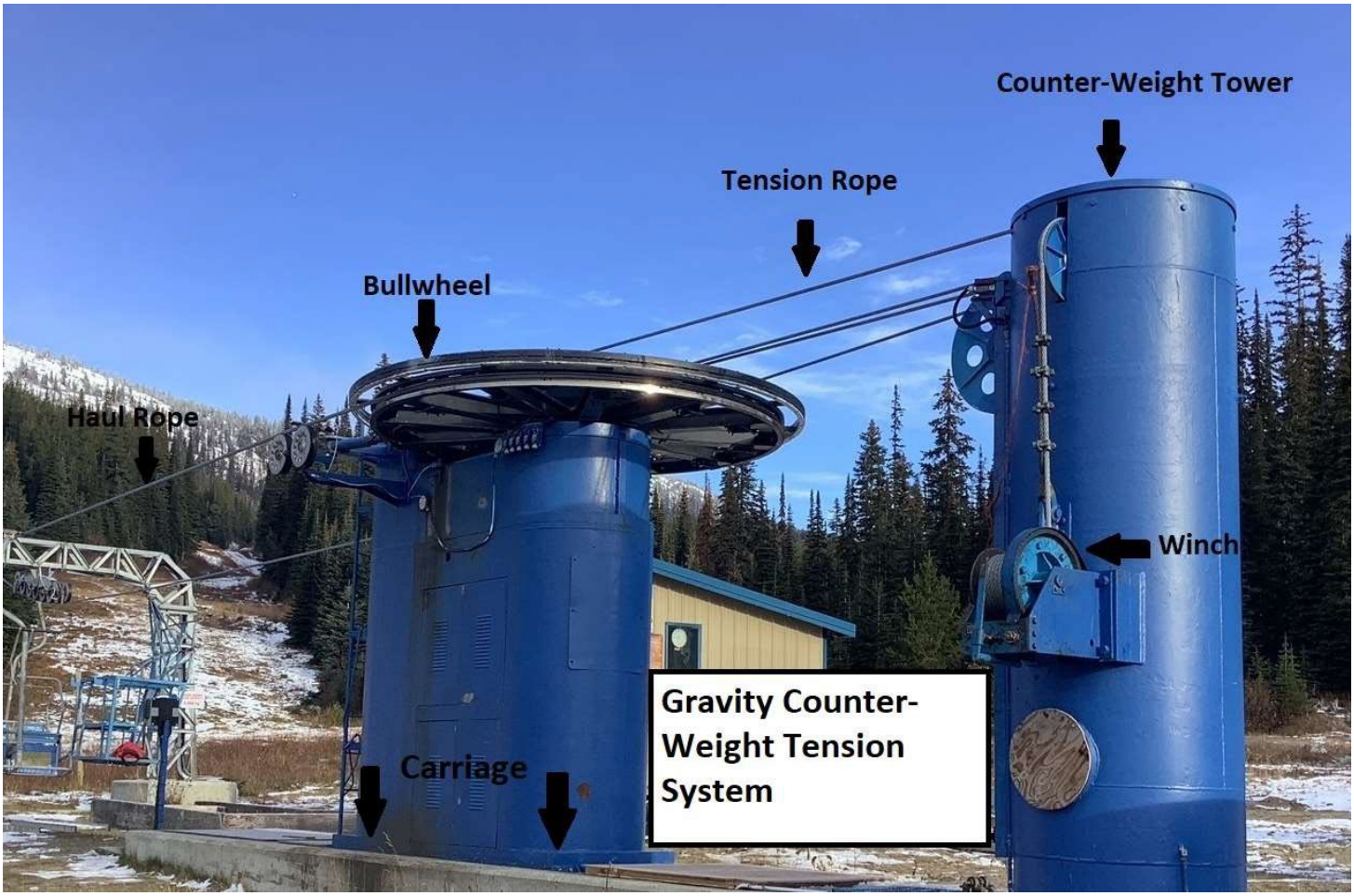

Image – Tension System.