

Incident Summary #II-2696202-2022 (#25660) (FINAL)

SUPPORTING INFORMATION	Incident Date	January 5, 2022	
	Location	North Vancouver	
	Regulated industry sector	Passenger ropeways - Above surface ropeway	
	Impact	Qty injuries	0
		Injury description	N/A
	Damage	Injury rating	None
		Damage description	Slight surface marks to the haul rope where the grip was pried off the cable, as well as gouges to the grip body as a result of the prying action.
		Damage rating	Minor
	Incident rating	Minor	
	Incident overview	Rope grip and carrier assembly inadvertently released from the haul rope, falling to the snow surface when entering the next compression tower sheave assembly, located on the unloaded side of the ropeway.	
INVESTIGATION CONCLUSIONS	Site, system and components	<p>In this ropeway configuration, the carrier assembly is attached mechanically to the haul rope using a mechanical grip.</p> <p>The grip attaches to the rope by encircling the haul rope with a grip body and grip jaw with a force designed by the manufacturer so that it will not move under normal operation. The rope grip is designed by the manufacturer with a profile that facilitates the function of the rope grip to pass smoothly over and under line sheaves, and around the drive and return bullwheels.</p> <p>During normal travel around the bullwheels, the grip is designed to make contact with the top flange of the bullwheel, which ensures the carrier travels around the bullwheel smoothly, without any excessive swing.</p>	
	Failure scenario(s)	<p>During passenger unloading at the return terminal (during normal operation), excessive carrier swing as the chair approached the bullwheel caused the grip horn to remain outside of the designed contact point of the bullwheel flange.</p> <p>As the carrier travelled around the bullwheel, the cable applied enough force to pry the grip off the cable, using the out of position grip and bullwheel flange as a fulcrum.</p> <p>At this point, the grip was still partially attached to the haul rope and continued to travel down the lift line until it came into contact with the Tower 2 compression sheave assembly, on the downhill side of the ropeway. As it entered the compression sheave assembly, the partially attached grip became fully detached and the carrier fell to the snow surface.</p>	

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Facts and evidence	<ul style="list-style-type: none">• Observed marks on the haul rope at the area where the rope grip had been attached.• Observed gouging to the rope grip body and jaw.• Inspected the return terminal with the manufacturers representative and observed the guide that controls carrier swing as it enters the bullwheel was out of alignment.• Lift had been de-tensioned and return terminal had been removed for service the previous summer. This included the removal of the chair swing guide.• There were no documented procedures or specifications for proper adjustment of the return terminal chair guide rail.• Return bullwheel flange was observed to be correctly installed as per manufacturers specifications, with all bolted connections torqued.
Causes and contributing factors	<p>It is highly likely that the misaligned chair swing guide allowed a swinging carrier into the return bull, causing the grip to miss the bullwheel flange causing enough force to partially pry the grip of the haul rope.</p>



Photo 1 - Indications on haul rope post incident- bright marks where the grip jaw was dragged across the surface of the rope.



Photo 2 - Damaged grip and grip jaw post incident - rope lay indications found on grip components. The large grooves on grip are to manufacturers design and correspond to the lay of the haul rope.



Photo 3 - Chair guide located at the top terminal, controls chair swing as the grip enters the bullwheel.



Photo 4 - Grip in correct position as it enters the bullwheel at the return terminal- grip horn and bullwheel flange designed to be in contact when the lift is in motion.



Photo 5 - Tower 2 downhill side where the unloaded carrier with the partially attached grip, contacted the compression sheave assembly, and fell to the snow.