

## Incident Summary II-903654-2019 #15155 (FINAL)

SUPPORTING INFORMATION	Incident Date	September 5, 2019	
	Location	Interior	
	Regulated industry sector	Passenger ropeways - Above surface ropeway	
	Impact	Qty injuries	0
		Injury description	Not Applicable
	Damage	Injury rating	None
		Damage description	Visible friction wear on the haul rope and 33 carriers were damaged. This includes bent safety bars and arm rests, abrasion to the fixed and moveable jaws.
		Damage rating	Major
	Incident rating	Major	
Incident overview	Maintenance personnel were performing tower line work from the use of a maintenance carrier. While moving between towers in reverse operation a carrier conveyance belt came off a pulley in the return station. This blocked carrier movement through the station resulting in multiple carrier collisions and pile-up.		
INVESTIGATION CONCLUSIONS	Site, system and components	High speed chairlifts detach each carrier from the haul rope when they are at drive and return stations. This allows for easier, safe and efficient loading and unloading of passengers. The grip is the device on the carrier (chair) that attaches to the haul rope. A detachable grip is designed to be opened (detached) and closed (attached) upon entry/exit of a station. When the detached grip is in a station it is not attached to the haul rope. It is conveyed through the station by a series of rubber tires that are connected to each other by V belts and synchronized to the speed of the haul rope. A monitoring safety system safeguards the operation of detaching/attaching of grips and carrier transport through stations.	
	Failure scenario(s)	The unmanned return station of a detachable chairlift had a belt for the carrier conveyance system come off a pulley. Carrier transport through the return station was interrupted at the location where the belt was removed. The adjacent carriers collided and stacked up in the return station as the ropeway continued reverse operation.	
	Facts and evidence	Regulatory requirements: <ul style="list-style-type: none"> <li>CSA Z98-14 clause 13.5.4 – when ropeway operating for maintenance purposes only one operator required.</li> <li>CSA Z98-14 clause 12.3.2.4 – operator shall be in attendance at the drive station while personnel working on the line</li> </ul> Manufacturer Service and Maintenance manual: <ul style="list-style-type: none"> <li>Refer to applicable codes when operating work carrier for maintenance</li> </ul> Ropeway Station monitoring safety system: <ul style="list-style-type: none"> <li>Does not function in reverse operation</li> </ul>	

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	<p>Contractor Procedures and Practice:</p> <ul style="list-style-type: none"> <li>• Operate ropeway in accordance with regulations – one operator at drive station</li> <li>• Reverse operation for maintenance in the work chair helps prevent need for a return station attendant, as safety monitoring system is inactive</li> </ul> <p>As reported by Contractor:</p> <ul style="list-style-type: none"> <li>• 33 carriers were involved in collision and pile-up – all components were NDT, this includes grips, hangers and chairs (bails) <ul style="list-style-type: none"> <li>- 13 grips need movable and fixed jaws replaced</li> <li>- 13 carriers require new restraining bars</li> <li>- 4 carriers require new arm rests</li> <li>- 4 grip/hanger require a new main axle</li> <li>- 3 chair bails had cracks and were repaired</li> </ul> </li> <li>• 450 meters of haul rope had intermittent abrasions – entire rope received NDT including MRT (magnetic rope test)</li> <li>• Wire cable (haul rope) experts require: <ul style="list-style-type: none"> <li>- Damaged area to be inspected monthly</li> <li>- Haul rope to be MRT (magnetic rope test) annually</li> </ul> </li> <li>• Adjustment to station carrier conveyance alignment and tension tested in forward operation only</li> </ul>
<p>Causes and contributing factors</p>	<p>It is very likely a belt failure in the station conveyance system for the chairs caused damage to the haul rope and a variety of components of multiple chairs.</p> <p>It is likely that contributing factors were that in reverse operation the carrier monitoring safety system will not function and operating without an operator in attendance at return station.</p>

## Piled-up Chairs in Return Station



Grip Jaw Wear



## Haul Rope Abrasion

