

Incident Summary (Reference #5578579) (Final)

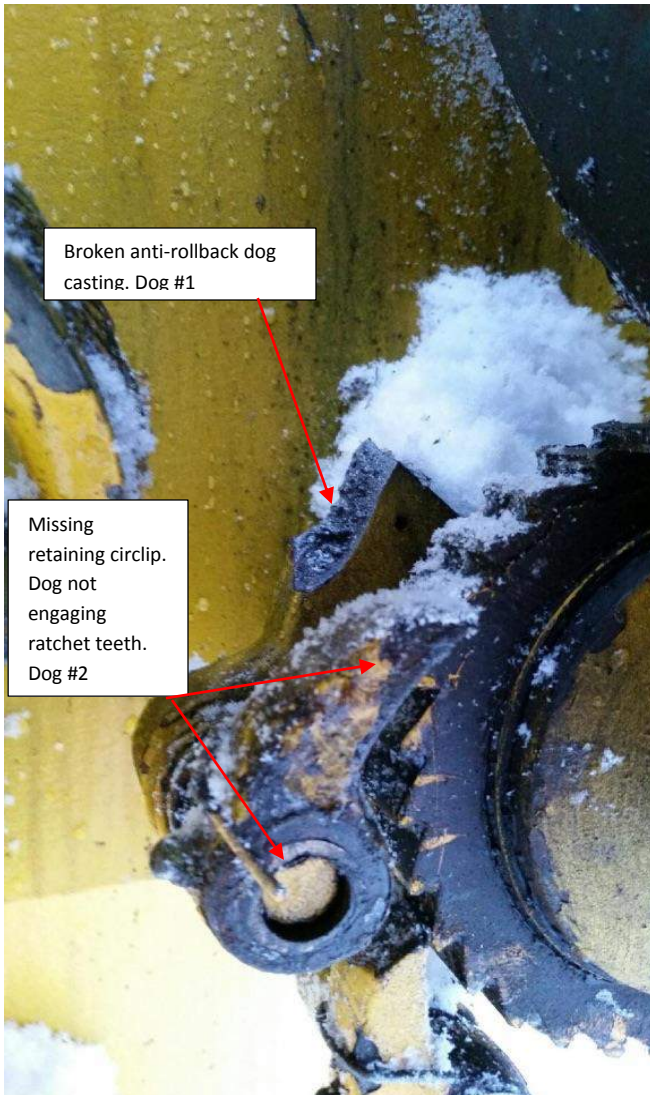
SUPPORTING INFORMATION	Incident Date		February 20, 2016	
	Location		Agassiz	
	Regulated industry sector		Passenger Ropeways- Above-surface ropeway.	
	Impact	Injury	Qty Injuries	0
			Injury description	None
			Injury rating	None
	Damage	Damage description	Broken tension system winch ratcheting mechanism casting.	
		Damage rating	Minor	
Incident rating			Minor	
DESCRIPTION	Incident overview		A maintenance person was performing an adjustment of the chairlift tension counterweight position. The maintenance person released the safety anchor line for the tension system counterweight winch and began to turn the winch. The winch anti-rollback device metal casting broke. The breaking of the casting caused the maintenance person to release the winch handle. The winch began to unwind slowly until the counterweight touched down at the bottom of the counterweight enclosure.	
	Site, system and components		The equipment is an above-surface fixed grip two passenger chairlift at a ski resort. The chairlift has been in operation since 1973. The counterweight tension system provides tension on the wire rope that supports and conveys the chairs. The counterweight tension system is comprised of a several thousand pound weight (counterweight) hanging in an enclosure attached to wire ropes that connect to the moving terminal of the chairlift to provide tension on the chairlift cable. The counterweight winch allows for the counterweight’s hanging position to be adjusted up or down to achieve optimal operating position. The counterweight winch is mounted to the outside of the counterweight enclosure. The counterweight winch is manually operated with a handle. The counterweight winch is equipped with a set of three anti-rollback ratchet dogs that provide protection from unintentional reversal of the winch while the counterweight is being raised with the winch. The three anti-rollback dogs are mounted to a cast steel mounting plate. The dogs in the system are not loaded with the full force of the counterweight by the design of winch. Only one dog at a time is actively taking load. The counterweight winch also has an internal brake to allow for controlled lowering of the counterweight with the winch. To lower the counterweight, a certain amount of force has to be applied to the winch handle which is then transferred to the one engaged dog of three dogs on the anti-rollback device to overcome the friction of the winch brake.	
CONCLUSI	Failure scenario(s)		When the winch was manually reversed the casting that supported the number one anti-rollback dog failed. The failure could have been the result of some external force that caused damage to the casting in this area in the past. When the casting failed the load was abruptly transferred to the number two anti-rollback dog. The impact to the	

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		number two dog caused the dog retaining circlip to fail allowing the dog to become disengaged with anti-rollback ratchet teeth. The load was then abruptly transferred to the third anti-rollback dog. The inertia gained by passing the first two anti-rollback dogs allowed the winch to continue to unwind. The speed of the winch was being controlled by the internal winch brake. The winch stopped when the counterweight touched the ground in the bottom of the counterweight enclosure.
	Facts and Evidence	-An analysis of the broken portions of the anti-rollback dog support casting was performed by a B.C. Professional Engineer. The report concluded that the casting failure appeared to be sudden without evidence of long term fatigue indications. - The Engineer's report noted a previous weld repair had been performed on the casting that supports the second dog. The presence of this repair indicates a failure of this manner had occurred sometime in the history of the piece of equipment. -The manufacturer inspected the winch casting and attachments and determined the anti-rollback dog retaining circlips were undersized and stretched. -The manufacturer reported that a casting failure of this nature on a similar winch had been reported in the past.
	Causes and Contributing Factors	The probable cause of the incident is external damage or a flaw in the design or quality of the casting that allowed it to fail under load. The winch movement however could have been arrested had the second anti-rollback dog retaining circlip not failed. Routine inspection of the winch may have identified these deficiencies and avoided this incident.

Photos or diagrams (if necessary)

SEE PHOTOS BELOW.





Normal anti-rollback
mechanism
configuration.