Incident Summary #II-957403-2019 (#16160) (FINAL)

SUPPORTING INFORMATION	Incident Date		December 6, 2019
	Location		Victoria
	Regulated industry sector		Elevating devices - Escalator or moving walkway
	Impact – Injury	Qty injuries	0
		Injury description	None
		Injury rating	None
	Impact – Damage	Damage description	Significant damage to multiple steps
		Damage rating	Moderate
	Incident rating		Moderate
	Incident overview		Mall shopper heard unusual noises coming from the escalator and hit the emergency stop button.
INVESTIGATION CONCLUSIONS	Site, system and components		An escalator, originally put into service in 1990. The escalator has moving *steps* that utilize multiple rollers running along steel tracks to keep the steps aligned as they rotate around the escalator. An *up-thrust track* is a roller guiding steel track that prevents the steps from rising up and out of alignment. This steel track is installed at the top and bottom transition sections, above pallet rollers, to provide the steps with a smooth guide track as the escalator steps transition from the flat sections and the inclined section. The escalator is provided with emergency stop switches at the top and bottom landings. When either stop switch is pressed the escalator removes power from the motor and drops its brakes, stopping the escalator and holding it in place. Comb-plates are installed at the top and bottom landing where the steps transition under the landing. The comb-plates have teeth that mesh with the grooves of the steps, ensuring the steps are aligned laterally as they enter the escalator.
	Failure scenario(s)		A mounting bolt on the up-thrust guide track at the top landing transition became loose. The guide track dropped down and caught multiple steps as they passed by, damaging the steps. A passerby heard loud noises coming from the escalator and pressed the emergency stop button, stopping the escalator.
	Facts and evidence		Evidence observed during on-site investigation:

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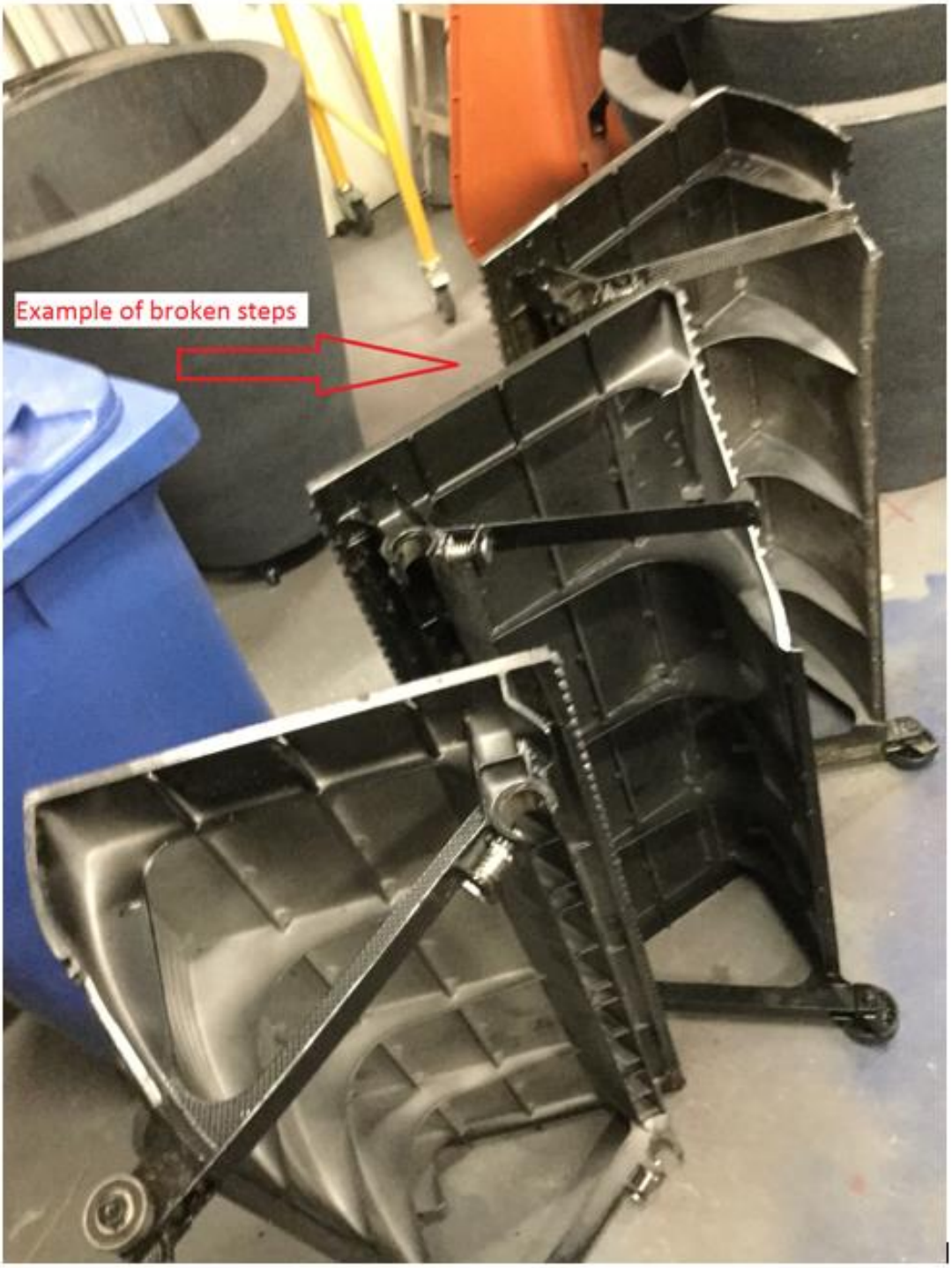
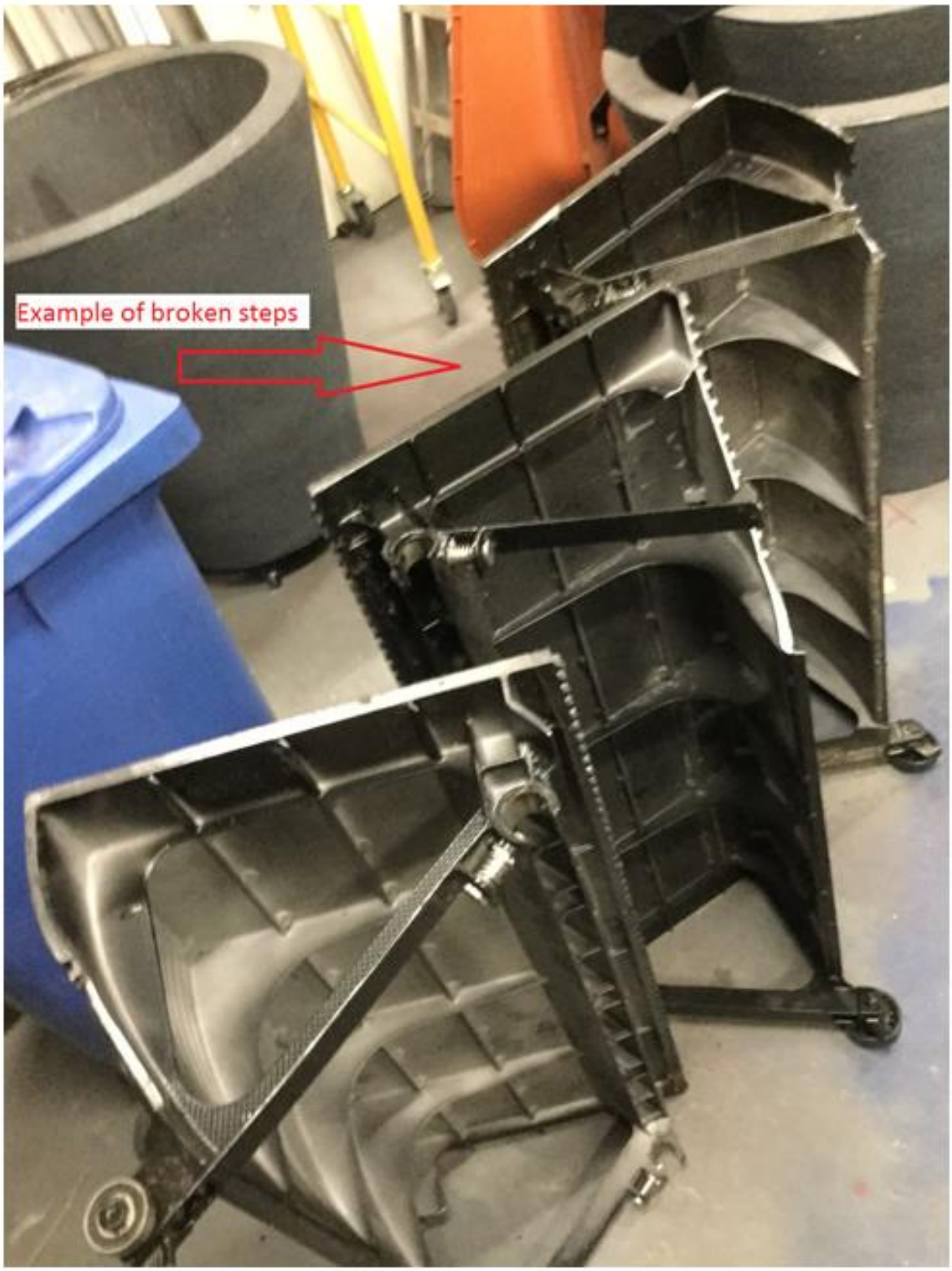
	• Contractor was advised that incidents must be reported to Technical Safety BC within 24 hours of an incident occurring as per the Information Bulletin: *Elevating Devices incident and hazard reporting IB-ED 2017-01* • There was no pile up of the escalator steps. • When the contractor first arrived on site, they blocked off the escalator to troubleshoot the cause of its shutdown. In subsequently moving the escalator to source the cause, they may have caused further internal damage. The escalator was then shut down and locked off. • A senior escalator mechanic was scheduled to be brought in to review the incident and help determine the cause. Technical Safety BC was scheduled to be in attendance when the internal review took place. • Senior escalator mechanic provided their detailed technical summary of the root cause behind the incident, determining that the up-thrust track caused the damage to the steps. No summary was provided for the cause of the part coming loose. • Escalator steps were able to freely move through the comb plates as no damage was observed at the comb plates themselves. • The up-thrust track was observed as extensively damaged. The up-thrust track has multiple attachment points. Looking down the escalator, the lowest attachment point came entirely loose and the next attachment point had the hardware pulled through. The top attachment point did not come loose, enabling the track to act as a spear when the steps were pulled through. The top attachment hardware and subsequently the track itself were removed by the contractor. • Four steps were damaged beyond repair and multiple other steps required parts to be replaced. • Loose metal pieces were observed inside the escalator, all caused by the incident. • Damaged steps and the up-thrust track were placed into a storage room on-site. • The escalator remains locked out of service and blocked off from public access. • The 3rd party consultant is involved with the owner regarding the decision on the repair and/or alteration of the escalator.
Causes and contributing factors	It is possible that during a recent repair, the up-thrust track fastener was not adequately tightened after adjustment, leading to the failure of the up-thrust track. It is likely that the up-thrust track came loose and subsequently dislodged during operation leading to the damaged steps. It is possible that during the initial inspection by the maintenance contractor that they damaged more steps by operating the escalator. It is certain that the passerby limited the damage to the escalator by pressing the emergency stop button during the initial incident.


Undamaged Combplate
OTIS


Bent Upthrust track


Upthrust track
where hardware
pulled through


Example of broken steps


Example of broken steps


Upthrust track attachment point