

## Incident Summary #II-983834-2020 (#16699) (FINAL)

SUPPORTING INFORMATION	Incident Date	February 21, 2020		
	Location	Duncan		
	Regulated industry sector	Elevating Devices – B44 Passenger Hydraulic		
	Impact	Qty injuries	1	
		Injury	Injury description	Bruising of two fingers
			Injury rating	Minor
	Damage	Damage description	Not Applicable	
		Damage rating	None	
Incident rating	Minor			
Incident overview	An elevator door closed on a young child's hand, the door was re-opened by the parent pressing the door open button, releasing the child's hand.			
INVESTIGATION CONCLUSIONS	Site, system and components	<p>A passenger elevator in an apartment building. The elevator has an automatic door that is powered by a motor and controller (<i>door operator</i>) located on the roof of the elevator car. The doors located at each landing are opened and closed by the elevator <i>door operator</i> when the elevator is stopped at a landing. A timer is set inside the main elevator controller to determine how long the door stays open (<i>dwelling time</i>).</p> <p>A light screen safety device is installed on the elevator door. This safety device consists of a light transmitting bar on the leading edge of the elevator door and a light receiving bar on the opposite side of the door opening. When the elevator door is open or partially open, the light screen detects objects located between the transmitting bar and the receiving bar and prevents the door from closing. If an object is detected by the light screen and is not removed, after a set amount of time (<i>nudging time</i>) the door will go into nudging mode where the light screen is bypassed, a buzzer sounds, and the door closes with a limited amount of force.</p> <p><i>See photo 1.</i></p>		
	Failure scenario(s)	The elevator lost its programmed timers for <i>dwelling time</i> and <i>nudging time</i> . The elevator door opened and immediately started closing in nudging mode, closing a child's hand in the door.		
	Facts and evidence	Code requirements for maximum door closing force in normal operation is 30lbf. Code requirements for maximum kinetic force of door closing in nudging mode is 3.5 joules.		

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	<p>Narrative of events based on interview with the responding mechanic:</p> <ul style="list-style-type: none"> <li>• The elevator had lost its programming for <i>dwell time</i> and <i>nudging time</i>, leaving both timers set to zero.</li> <li>• The door would open and immediately start closing. If an object was blocking the door the buzzer would sound and the door would immediately go into nudging mode.</li> <li>• Nudging mode operated at the same speed as the normal closing speed.</li> <li>• The mechanic reset the <i>dwell time</i> and <i>nudging time</i> before shutting the unit down.</li> </ul> <p>Evidence observed during on-site investigation:</p> <ul style="list-style-type: none"> <li>• Nudging mode operated at the same speed as the normal closing speed – 45ft/min (approximately 3 joules kinetic force). Meets code requirements.</li> <li>• Door close force, under normal operation, was 25lbf. Meets code requirements.</li> <li>• Mechanic reduced closing speed of the door in nudging mode from 45 ft/min to 18 ft/min to provide additional safety.</li> <li>• Electronic contacts of door lock and car gate functioning correctly.</li> <li>• Maintenance records indicated that mandatory maintenance was being performed at scheduled intervals.</li> </ul> <p>Narrative of events based on phone conversation with parent who witnessed incident:</p> <ul style="list-style-type: none"> <li>• Parent and child called elevator on second floor of building.</li> <li>• Car arrived and child entered the elevator as soon as doors opened.</li> <li>• Doors opened fully and started closing immediately.</li> <li>• Child turned and reached towards parent located outside the elevator as the door was closing.</li> <li>• Door closed on child's hand.</li> <li>• Parent pressed the hall call button on second landing multiple times.</li> <li>• Door re-opened and child's hand was released.</li> <li>• Door started to close again, parent held door open.</li> <li>• Child was afraid to exit the elevator so parent entered the elevator.</li> <li>• Elevator drove down to the bottom landing, doors opened and immediately started closing.</li> <li>• Person located at bottom landing held the elevator door open so parent and child could exit.</li> </ul>
<p>Causes and contributing factors</p>	<p>The elevator losing its <i>dwell time</i> and <i>nudging time</i>, causing the door to close almost immediately in nudging mode, was likely the main contributing factor.</p> <p>The door closing at normal speed during nudging mode was possibly a contributing factor.</p>

Photo 1 – Elevator entrance with details.

