

Incident Summary #II-888382-2019 (#14664) (FINAL)

SUPPORTING INFORMATION	Incident Date		August 2, 2019	
	Location		Vancouver	
	Regulated industry sector		Amusement Devices - Amusement ride	
	Impact	Injury	Qty injuries	2
			Injury description	Headache, dizziness, some nausea.
			Injury rating	Insignificant
	Damage	Damage	Damage description	No damage
			Damage rating	None
Incident rating		Insignificant		
Incident overview		During the ride cycle, the gondola rotation did not come to a stop in the horizontal position, passengers were unable to disembark the spinning ride until an emergency stop was initiated by maintenance personnel, who had been alerted by the ride operators, through dispatch.		
INVESTIGATION CONCLUSIONS	Site, system and components		<p>Up to 2 people sit in one of the twenty gondola cars, which are arranged in a circle, and loaded with passengers, while the ride frame is in a horizontal position. At start, the ride moves in a clockwise direction on the horizontal plane and then a hydraulically operated arm raises the ride frame, so it is at an almost vertical plane for a specific period of time.</p> <p>The ride frame is then lowered back hydraulically to the horizontal plane, where the ride comes to a complete stop upon actuation of hydraulic arm position proximity switch (5B6) and passengers disembark.</p>	
	Failure scenario(s)		<ul style="list-style-type: none">During the incident ride cycle, the cam that would normally actuate the proximity switch to stop the rotation at the return to horizontal position did not actuate the proximity switch.	
	Facts and evidence		<ul style="list-style-type: none">Mounting plate for the proximity switch (5B6) was found to be loose upon physical inspection, the proximity switch was sitting below the reach of the hydraulic arm actuator cam.According to electrical maintenance staff, no maintenance had been conducted on the proximity switches, including inspection, since the hydraulic rebuild conducted by the manufacturer in 2017.It is unknown if the measurements for the setup of the proximity switch (5B6) and hydraulic arm actuator cam were within tolerances specified by the manufacturer.Upon the return of the hydraulic arm to the horizontal position, the ride continued to rotate until an emergency stop button was depressed by staff.	

Incident Summary #II-888382-2019 (#14664) (FINAL)

Causes and contributing factors

It is highly likely that the loose mounting plate for the proximity switch (5B6), permitted the actuator cam on the hydraulic arm to miss the proximity switch (5B6), allowing the ride to continue to rotate in the horizontal position, until an emergency stop was depressed.

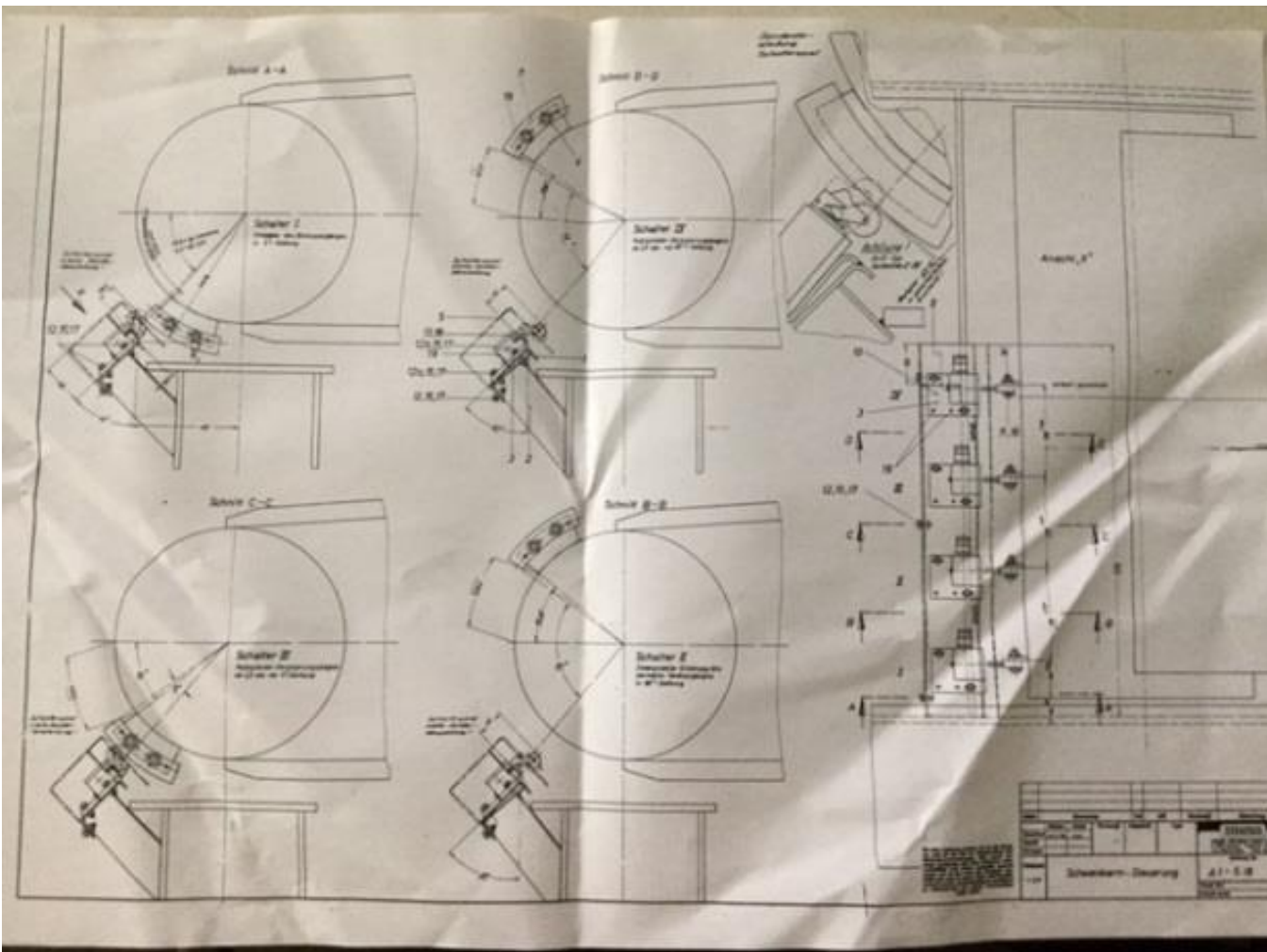
It is likely that the mounting plate became loose due to vibrations during operation.



Proximity switch rack, and base of hydraulic arm with actuator cam(s)



Proximity switch 5B6, proximity switch bolted mounting plate, hydraulic arm actuator cam.



Technical drawing of relationship between proximity switches and actuator cams.