PE16-014 Closing Resume Summary Details
Dodge Durango / Ram 1500 Vehicle Rollaway

Basis – On December 16, 2016, the Office of Defects Investigation (ODI) opened Preliminary Evaluation PE16-014 to investigate 43 vehicle rollaway incidents with operators alleging they had shifted to Park and then exited the vehicle prior to the rollway incidents. These complaints involved multiple Fiat Chrysler Automobiles (FCA) model and model year vehicles that share a common electronic rotary shifter design. Of the 43 consumer complaints, 25 complaints alleged crashes, and eight complaints alleged at least one injury.

Subject Vehicles – When NHTSA opened the investigation, the subject vehicles were model year (MY) 2013-2016 Ram 1500 vehicles and MY 2014-2016 Dodge Durango vehicles equipped with a rotary electronic shifter. However, NHTSA expanded the scope of the investigation to include subsequent model years of the same model vehicles when the Agency learned that those new model year vehicles use the same rotary shifter. Additionally, all subject vehicles manufactured by FCA are equipped with electronic rotary shifters supplied by Kostal Automotive.

Peer Vehicles - Peer vehicles were also analyzed during the investigation and information concerning these vehicles was collected in an Information Request letter, which was sent to FCA in February 2017. The peer vehicles included MY 2013-2017 Ram 1500 vehicles that were not equipped with rotary shifters. The peer vehicles also included MY 2015-2017 Chrysler 200 and Chrysler 300 vehicles, and MY 2017 Chrysler Pacifica vehicles, all of which were equipped with rotary shifters.

Alleged Defect – One or more of the following symptoms or conditions:

a. Vehicle movement after the operator attempted to shift to Park while either the engine is running or has been turned off;
b. Shift-by-wire system shifting to Neutral or another non-Park gear when the operator attempted to shift to Park (or when a driver thought the vehicle shifted out of Park on its own); or
c. Difficulty or confusion shifting the vehicle to or from Park, or requiring multiple attempts to achieve Park when attempting to shift to Park.

Subject System Description – The relevant owner's manual text supplied in the manufacturer's response to an Information Request letter states the following:

> "The transmission is controlled using a rotary electronic gear selector located on the center console. The transmission gear range (PRNDL/S) is displayed above the gear selector. To select a gear range, simply rotate the gear selector. Push down on the gear selector and then rotate it, to access the L or S position. You must also press the brake pedal to shift the transmission out of PARK, or to shift from NEUTRAL into DRIVE or REVERSE when the vehicle is stopped or moving at low speeds (refer to "Brake/Transmission Shift Interlock System" in this section). To shift past multiple gear ranges at once (such as PARK to DRIVE), simply rotate the gear selector to the

appropriate detent. Select the DRIVE range for normal driving. NOTE: In the event of a mismatch between the gear selector position and the actual transmission gear (for example, driver selects PARK while driving), the position indicator will blink continuously until the selector is returned to the proper position, or the requested shift can be completed."

FCA also furnished examples of when the subject systems would automatically shift the transmission to Neutral. Those examples included: an attempted shift to Park when driving a vehicle more than 1.2 mph; a low engine rpm not allowing the transmission to hold a gear; a mismatch between the rotary shifter and the transmission; turning an engine off while driving more than 1.2 mph (the vehicle will shift to Park after the vehicle's speed falls below 1.2 mph); a hardware failure in the transmission; a loss of communication with rotary shifter while the transmission is in Reverse; and "Abnormal and extensive physical damage to any of the components that make up the park system," which FCA notes would generally result in a stored error code.

Prior Investigations – Some ODI investigations of powered rollaway incidents have influenced manufacturer decisions to issue a recall. However, those ODI investigations identified design or manufacturing defects that contributed to the increased likelihood of mis-shifts when drivers attempt to select Park. Two examples are listed below.

1. Engineering Analysis 04-025 influenced the recall of approximately 250,000 diesel-powered heavy-duty pick-up trucks to correct a defect in the transmission that could result in the transmission reaching a static gear position between Reverse and Park (NHTSA Recall No. 05V-462). In this static gear state, the park pawl is not engaged to lock the propulsion shaft and the transmission spool valve may be placed in a position resulting in gradual pressurization of the reverse circuit leading to a delayed powered rollaway in Reverse. Either condition may result in unexpected vehicle movement after the driver has exited the vehicle. The recall remedy involved programming the vehicle to provide audible and visual warnings to the operator if the driver is exiting the vehicle when the transmission is not in Park.

2. Engineering Analysis 16-002 influenced the recall of approximately 812,000 vehicles equipped with monostable E-shift gear selectors to correct a defect related to a non-intuitive shifter function that was confusing to drivers, resulting in high rates of shifting errors when attempting to select Park, as well as gear selection logic that automatically selected Neutral in certain conditions (NHTSA Recall No. 16V-240). The recall remedy involved reprogramming the gear selector control logic to automatically select Park under certain conditions.

As part of that investigation, ODI reviewed a Human Machine Interface Study performed for the manufacturer to review usability and acceptance of a new polystable E-shift design. The study compared the monostable E-shift design that was the subject of EA16-002 with the rotary E-shift design that was used in the vehicles which are the subject of this investigation, as well as a gated mechanical gear shift design. The study found high

error rates for the monostable E-shift design in shifts to Park and focus groups characterized that design as “insecure,” “confusing,” and “unintuitive.” In comparison, the rotary shifter design produced the lowest rate of parking errors and was characterized as “convenient,” “easy,” and “intuitive.”

Applicable Safety Standards – Federal Motor Vehicle Safety Standard (FMVSS) No. 114, Theft protection and rollaway prevention (49 CFR § 571.114) applies to the subject population. There were no findings in the course of this investigation that the subject vehicles did not comply with the applicable standard.

Shifting Error Countermeasures Present Before the Investigation – In FCA’s response to an ODI Information Request, FCA highlighted a number of design characteristics and attributes intended to mitigate unintended gear selection, which include:

1. Differences in tactile characteristics such as differences in knob height, diameter, and turning resistance from other rotary controls in the vehicle (Climate, Radio Volume, Transfer Case, etc);
2. Distances from other rotary controls in the vehicle;
3. Park and Neutral Brake Transmission Shift Interlock (BTSI); and
4. Flashing indicator lighting to notify drivers of fault conditions, which include mismatches between the Gear Shift Module and Transmission.

FCA’s Customer Satisfaction Notification (CSN) Actions – As a result of this Preliminary Evaluation, FCA launched a program that implements a vehicle securement strategy, to mitigate the outcome of shifting errors, on the majority of subject vehicles via CSN numbers U05, U06, U07, and U08. FCA also implemented the strategy in production and across non-subject and upcoming models in FCA’s portfolio that utilized electronic shifters. The securement strategy was enacted via a software change that enables vehicles to automatically shift the transmission to Park when one of the following criteria are met:

1. The vehicle is not moving and the engine is shut off;
2. The driver’s seat belt is unbuckled, the driver’s door is open, and the vehicle is below the threshold speed;
3. A driver attempts to put a vehicle in Park when the vehicle’s speed is too high, so the vehicle shifts to Park after it is below the threshold speed within a certain amount of time of the driver’s attempt to shift to Park.

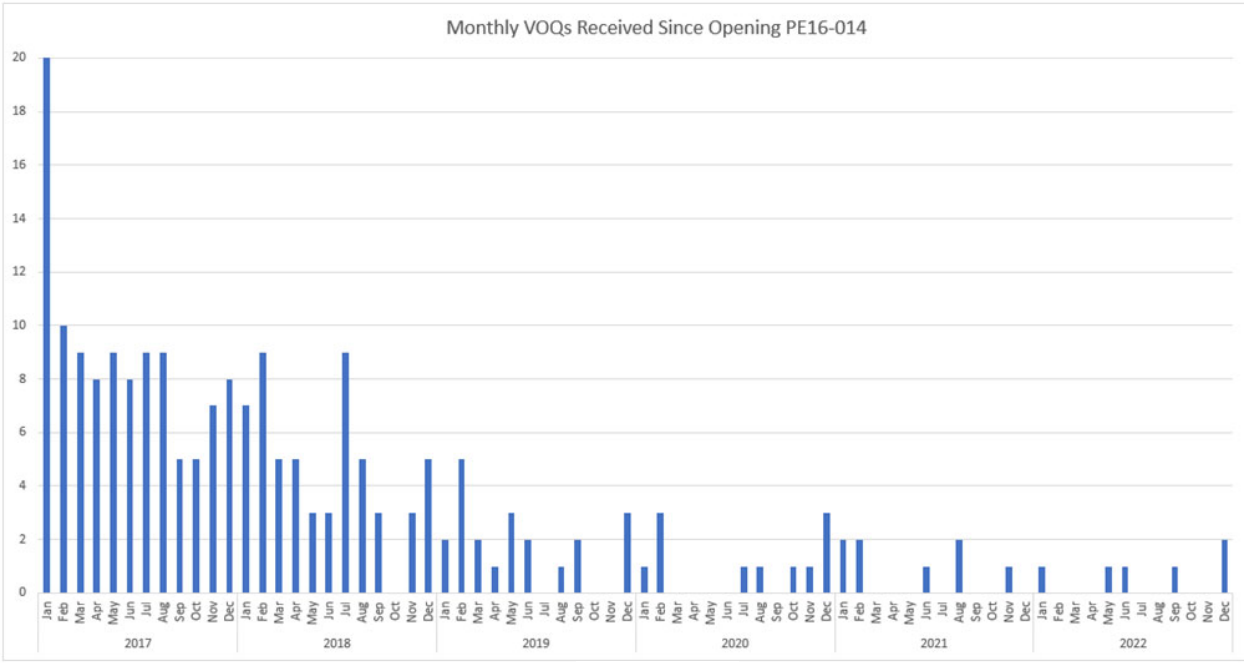
While not relevant to whether a safety defect exists and a recall is therefore required, NHTSA has been following the completion rate of these CSN actions and the rates are commensurate with recall completion rates for similar vehicle populations where a safety defect had been identified. The below table provides the CSN completion rates at the time of the closing of this Preliminary Evaluation.

CSN	Model Year	Family	Family Description	Built for Market	4/11/2023 Completion Rate
U05	2017	DS	RAM 1500 PICKUP	US	89.50%
U05	2017	LX	CHRYSLER 300	US	90.80%
U05	2017	WD	DODGE DURANGO	US	88.60%
U06	2014	WD	DODGE DURANGO	US	81.80%
U06	2015	WD	DODGE DURANGO	US	86.00%
U06	2016	WD	DODGE DURANGO	US	87.70%
U07	2013	DS	RAM 1500 PICKUP	US	77.70%
U07	2014	DS	RAM 1500 PICKUP	US	78.80%
U07	2015	DS	RAM 1500 PICKUP	US	81.20%
U07	2016	DS	RAM 1500 PICKUP	US	82.00%
U08	2015	LX	CHRYSLER 300	US	85.00%
U08	2016	LX	CHRYSLER 300	US	76.70%

Table 1.

Population not initially covered by FCA CSN - A sub-population of subject Ram 1500's equipped with diesel engines were recalled (Recall V08) due to an emissions matter and were not able to receive the CSN U07 software update if they opted out of receiving the emissions recall (Ability to opt-out required by the EPA consent agreement surrounding the recall). As such, FCA had not given owners of vehicles who were subject to the emissions recall notification of the concern that CSN U07 addressed. As a result of discussions with ODI, FCA undertook consumer notification regarding the CSN to these vehicles beginning in February of 2022.

Complaint History – During the course of this investigation, NHTSA has seen a decrease in the rate of consumer complaints. NHTSA believes that the decrease is due to the FCA CSN actions as well as consumers becoming more familiar with the rotary shifter functionality. The below graph illustrates the decrease in consumer complaints received by the Agency.



Graph 1.

Reason for closing - During the course of this investigation, ODI did not find evidence that a vehicle-based design or manufacturing defect was the cause of vehicle rollaway incidents on the subject vehicles. Nevertheless, given the risk of a vehicle rollaway, FCA's CSN actions provide automated vehicle securement when an operator attempts to exit the vehicle without successfully achieving a Park position with the rotary shifter mechanism. ODI closely monitored the subject vehicles on which the CSN actions implement a vehicle securement strategy and found that the CSN actions were effective in reducing the frequency of vehicle rollaway incidents in the subject vehicles.

ODI analyzed the incidents when a CSN had been implemented and a rollaway still occurred, and ODI was unable to find an actionable defect that caused vehicle rollaway incidents. ODI found that the failure rates on subject vehicles that received a CSN remedy were similar to the failure rates on other vehicle populations and additionally had similar mechanisms as other vehicle populations such as slippery surfaces and various mechanical failures. Furthermore, as discussed above, after FCA's release of the CSN actions, consumer complaints have decreased significantly. Given the absence of an identified safety defect based on available information and FCA's customer satisfaction campaign which addresses the failure mode, further action is not warranted at this time.

Accordingly, this Preliminary Evaluation is closed. However, the Agency reserves the right to take further action, if warranted.

The ODI reports cited can be reviewed at:

https://www.nhtsa.gov/recalls?nhtsaId.

Using the following complaint ID numbers:

10554951, 10559744, 10617268, 10648455, 10664380, 10701261, 10726180, 10744809, 10746574, 10749304, 10761819, 10764187, 10787674, 10808836, 10820611, 10825024, 10859918, 10860998, 10861070, 10861275, 10861466, 10863765, 10865590, 10870288, 10875626, 10875918, 10883952, 10884961, 10887416, 10896337, 10898192, 10898999, 10899161, 10903709, 10906809, 10910068, 10911170, 10914057, 10917680, 10917771, 10923886, 10926262, 10936408, 10936424, 10936432, 10936444, 10936473, 10936488, 10936508, 10936589, 10936592, 10936659, 10936660, 10936663, 10936712, 10936725, 10936731, 10936741, 10936771, 10936810, 10936820, 10936821, 10936828, 10936829, 10937050, 10937204, 10937281, 10937308, 10937361, 10937366, 10937396, 10937461, 10937490, 10937689, 10937699, 10937858, 10938422, 10938731, 10938747, 10938780, 10938793, 10939092, 10939252, 10939821, 10940067, 10940315, 10940345, 10940348, 10943851, 10944620, 10944649, 10944678, 10945145, 10945899, 10946140, 10946329, 10946844, 10947109, 10948987, 10949084, 10949677, 10954479, 10954606, 10955064, 10955417, 10955721, 10955910, 10957844, 10957950, 10958947, 10967051, 10967538, 10967557, 10968156, 10969213, 10969850, 10970425, 10970491, 10970860, 10970936, 10978745, 10979158, 10981397, 10983865, 10984698, 10985661, 10985673, 10991326, 10991360, 10991563, 10991756, 10992274, 10993073, 10994036, 10994917, 10995458, 11000083, 11000211, 11000681, 11002506, 11002648, 11004240, 11005355, 11006347, 11006483, 11006733, 11010511, 11012479, 11013661, 11015875, 11016020, 11019010, 11019094, 11019434, 11020964, 11024833, 11024962, 11030294, 11031468, 11032778, 11033964, 11041334, 11041523, 11043416, 11043897, 11043942, 11044874, 11046240, 11047055, 11048622, 11051694, 11052175, 11053001, 11054672, 11055092, 11057632, 11061458, 11061581, 11062132, 11064670, 11065734, 11066200, 11066329, 11066783, 11071577, 11071776, 11072303, 11072628, 11073457, 11074241, 11074954, 11076570, 11078632, 11079956, 11081984, 11082404, 11084190, 11084436, 11089933, 11096907, 11099030, 11099523, 11103559, 11104601, 11105356, 11110308, 11111133, 11111198, 11111517, 11113088, 11114273, 11114288, 11115646, 11120641, 11121493, 11121737, 11123616, 11124231, 11131628, 11150938, 11151552, 11162324, 11174236, 11179755, 11180342, 11196391, 11220691, 11257274, 11283095, 11288912, 11289624, 11299571, 11301995, 11362738, 11427881, and 11468188.