



DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA-2014-0108]

Denial of Motor Vehicle Defect Petition, DP14-001

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Denial of petition for a defect investigation.

SUMMARY: This notice sets forth the reasons for the denial of a petition submitted on November 14, 2013, by Mr. Donald Friedman to NHTSA's Office of Defects Investigation (ODI). The petition requests that the agency commence a proceeding to determine the existence of a defect related to motor vehicle safety with respect to the air bag system's logic and algorithm. The Petitioner alleges that a defect in the Occupant Classification System (OCS) in various model year (MY) 2004-2010 General Motors (GM) vehicles causes an unintended suppression of the front passenger air bag moments prior to a frontal impact/crash. After examination of the petition and available data relating to the subject vehicles' OCS and the specific crash incident where the OCS allegedly failed to operate properly, NHTSA has concluded that further expenditure of the agency's investigative resources on the issues raised by the petition is not warranted. The agency accordingly has denied the petition. The agency will continue to monitor OCS performance in subject vehicles and may take further action as appropriate. The petition is hereinafter identified as DP14-001.

FOR FURTHER INFORMATION CONTACT: Mr. Scott Yon, Vehicle Defects Division B, Office of Defects Investigation, NHTSA, 1200 New Jersey Ave. SE, Washington, DC 20590, desk phone 202-366-0139.

SUPPLEMENTARY INFORMATION: By letter dated November 14, 2013, Mr. Donald Friedman of Santa Barbara, CA, submitted a petition requesting that the agency investigate the passenger air bag OCS in MY 2004-2010 GM models. The petition was based on an April 2011 crash occurring in Texas, involving a MY 2008 Chevrolet Impala which was occupied by an elderly couple with a 108- pound female spouse driving the vehicle and a 170-pound male sitting in the passenger seat; both occupants were belted. The Impala veered off the left inner lane and across the left shoulder lane and impacted the median Jersey barrier multiple times. The vehicle impacted the barrier with a force sufficient to cause the vehicle to run up/climb the barrier and to deploy the front driver air bag; the passenger air bag was not deployed due to OCS suppression. Both occupants were injured, and the male passenger developed additional medical complications post-crash. The petitioner alleges that the weight-based OCS algorithm used in the MY 2008 Chevrolet Impala is defective based on his assessment that, in this crash, it inaccurately changed the occupant classification and suppressed the passenger air bag moments prior to the frontal impact. In addition, the petitioner alleges that GM used this type of OCS in other GM models since 2003, and therefore all MY 2004-2010 GM models may be similarly defective. The petitioner cites an Insurance Institute for Highway Safety (IIHS) report and FARS data to further support his allegation.

ODI contacted the Petitioner for clarification, and in support of these claims the Petitioner provided additional information on February 14, 2014, and again on May 8, 2014. In the initial phase, ODI reviewed the submitted petition and subsequent information, which includes the following documents and data related to the Impala crash: an air bag control module event data record/output, an OCS data record/output, the police accident report, vehicle photos, accident scene photos, and medical records for the occupants. ODI also reviewed the IIHS Status Report

and the Fatal Accident Reporting System (FARS) data analysis the petitioner provided. In addition, ODI conducted an initial review of other internally available databases for information that may indicate a defect condition or trend with the subject vehicles' OCS. This includes: consumer VOQ reports on MY 2004-2014 Impala injury crashes that alleged an abnormal air bag deployment or a non-deployment of the passenger side air bag in the frontal crash event, a search of the NHTSA's National Automotive Sampling System, a search of the NHTSA Special Crash Investigations (SCI) reports and cases indicating split deployments (where the driver's frontal air bag deployed but the occupied passenger's air bag did not) and GM's Early Warning Reporting data on death and injury for Impala vehicles.

The results of these initial reviews did not identify an OCS-related defect trend in the MY 2004-2014 Impala. However, out of an abundance of caution, NHTSA undertook a more detailed review of the subject Impala's OCS, which included a request to GM for GM data on the MY 2006 to 2008 Impala as it related to the alleged OCS issue.

On July 22, 2014, ODI opened a Defect Petition (DP14-001) to further review the crash event, perform a more comprehensive FARS search and analysis, and collect the manufacturer's reports on the alleged OCS issue on the subject Impala vehicles and other GM and non-GM peer vehicles. The specific OCS used in the Impala is widely used in other GM products as well as non-GM peer vehicles. From the period of MY 2006-2008, over 850,000 Impala vehicles were equipped with this OCS. 1 million (M) GM peer vehicles and another 2.1 M non-GM peer vehicles sold in the US also used a substantially similar OCS. With such widespread usage, any defect concern in this OCS should be readily detectable in the Impala and in other peer vehicles using the same OCS design.

The following is a summary of the reviews and analysis conducted during DP14-001:

- Description of the Passenger Occupant Detection System: Per FMVSS 208, all light duty passenger vehicles were required to have a passenger occupant detection system, capable of detecting an adult, infant/child or an empty seat, by the start of vehicle production for MY 2006. When the passenger seat is empty, or occupied by an infant/child or person weighing less than specified threshold amounts, the passenger frontal air bag is suppressed and will not deploy in the event of a frontal crash that would otherwise require the frontal air bag to deploy. The OCS used in the subject Chevrolet Impala, commonly known as the PODS-B (Passive Occupant Detection System-B) design, is a widely-used system that detects the weight of the passenger via a pressure sensing fluid-filled bladder mat integrated into the seat base cushion. When the occupant/load is removed from the seat, the system resets and readies for any new occupant types within seconds of load removal. Additional features are incorporated into the OCS design to reduce the likelihood that the system will change classification state due to normal vehicle road dynamics/bumps and certain types of occupant movements within the seat. The system can also lock the classification state just prior to an impact to prevent classification change during a crash event.
- Review of the Petitioner's Cited April 2011 Crash Event: To better understand this multi-impact crash condition, ODI requested NHTSA's Special Crash Investigation Office (SCI) assist in the review of the crash event, crash scene and the available crash data/records. The following is ODI's summary of the crash event and details provided in the SCI report under reference number CR14068. Supplemental GM assessment is also added and noted. The status of the passenger OCS is shown in "[]" where appropriate:

- On the day of the event, no prior air bag issues or faults were noted as recorded in the EDR data (i.e. the OCS was operational prior to the crash event).
- The incident occurred on a 6-lane divided highway (3 lanes for each direction plus “pull over lane,” separated by a concrete Jersey barrier).
- The subject MY 2008 Impala was in the left-most lane going approximately 65mph.
- The subject vehicle (SV) was driven by an 86-year old restrained female driver [the passenger air bag was enabled/ON while occupied by the male spouse].
- **1st Event** - An unknown sport utility vehicle in front of the SV moved over from the middle lane into the SV’s left lane, impacting the SV’s right front (the unknown SUV left the scene without stopping) [the passenger air bag was enabled/ON at this initial non-deployment impact event].
- **2nd Event** – Upon impact, the SV steered towards the left [the OCS sensed a “release of occupant load” at this time] and into the concrete barrier with the left front of the SV impacting (11 o’clock position) the Jersey barrier, causing the frontal driver air bag to deploy [passenger air bag was in the suppressed/OFF state at this 2nd Event impact].
 - The SCI report concluded that the OCS “switching” to the suppressed state was likely due to “...*the passenger reached for an object (steering wheel) within the vehicle or repositioned himself on the seat cushion, thus causing the OCS to reclassify his status.*”
 - ODI notes GM’s identification of blood stains on the driver air bag cushion surface and GM’s observation that the passenger (only) had a hand/finger

injury which resulted in blood loss, while the driver did not have injuries that produced blood loss.

- **3rd Event** – The SV continued to rotate counter clockwise (270 degrees) and then impacted the barrier for a second time in the rear of the vehicle (at the 7 o'clock position) and slid to its final rest point.
- According to the medical records, the 89-year-old male passenger was hospitalized for 27 days, mainly due to complications from other pre-existing medical conditions, and then was admitted to a rehabilitation center/long term nursing facility. The male passenger died 9 months after the date of crash.
- The driver was hospitalized for 7 days after the crash and was then released.
- GM provided an assessment suggesting that as the vehicle veered left towards the Jersey barrier (after event #1), the passenger reached for the steering wheel in an attempt to steer the vehicle away from the barrier. The assessment suggested that in doing so the passenger moved from his seating position, thus changing the OCS state and suppressing the passenger air bag approximately 1.2 sec prior to the impact/deployment event. GM opined that blood evidence on the driver air bag is indicative of the passenger's hand position at or during the impact into the barrier.
- ODI's review of the available EDR and PODS data is consistent with that described in the SCI crash analysis.
- ODI concludes that, based on the available EDR and PODS data, the OCS system operated as designed and suppressed the passenger air bag (based on inputs to the system) prior to the Event #2 impact which resulted in the non-deployment of the passenger air bag.

- Summary of ODI's analysis of Fatal Accident Report System (FARS) data: If a defect existed in the subject OCS, it is reasonable to conclude that this would be identifiable in FARS data via the following method: 1) crashes that resulted in frontal air bag deployments involving (at least) the driver side air bag, 2) where the passenger seat was occupied by an adult statured person, and 3) the passenger side air bag did not deploy, resulting in an injury or fatality of the passenger. ODI requested the assistance of NHTSA's National Center for Statistics and Analysis (NCSA) to provide FARS reports on the subject Impala, the GM peer vehicles (Chevrolet Cobalt, Buick Lucerne, Cadillac DTS and XLR) and the non-GM peer vehicles (Ford Fusion, Toyota Camry & Nissan Altima) that used the PODS-B OCS system. The request included vehicles across the MY 2006-2008 production period. Over 21 M vehicle registration years were identified for the PODS-B equipped vehicles under evaluation. NCSA identified a total of 625 FARS reports in which any of the above vehicles were involved in a fatal crash between 2005 to 2012 (which represented the latest available crash data at the time of the analysis).
 - 313 of the above 625 fatal crashes involved a fatality in a subject or peer PODS-B equipped vehicle.
 - 201 of the above 313 involved a deployment of the subject or peer driver air bag.
 - 17 of the above 201 involved a non-deployment of the passenger air bag and a passenger fatality (and an adult-sized passenger).
 - Three of the 17 involved the MY 2006-2008 Impala, resulting in a rate of 0.63 incidents per million registered vehicle years, which is slightly lower than the peer group average of 0.73 incidents per million registered vehicle years.
 - Two of the above three fatalities involved unbelted passenger occupants.

- The one remaining fatality involved an older occupant (> 75 years old) where the seat belt status could not be established.

ODI concluded that the FARS analysis showed the overall occurrence of passenger fatality due to OCS air bag suppression is low (less than 1 per million registered vehicle years) and that the Impala is not an outlier in terms of passenger side fatalities (due to the passenger air bag being suppressed and/or not deploying) when compared to other GM peer and non-GM peer vehicles.

- Summary of GM's Reports: As part of its analysis, ODI requested information from GM on the MY 2006-2008 Impala and other GM peer vehicles that use the same PODS-B OCS system. Based on GM's response that identified 10 alleged complaints on approximately 851,000 vehicles produced, the Impala vehicles had an exposure adjusted complaint rate of approximately 0.16 incidents per 100,000 vehicles per year. By comparison, the peer vehicles had eight alleged complaints from 617,000 vehicles produced and thus had an exposure adjusted complaint rate of 0.17 incidents per 100,000 vehicles per year. These rates are comparable and do not support the existence of a defect trend in the Impala OCS compared to the other GM vehicles.
- GM Assessment: As stated in their response to ODI's information request, GM's assessment of the alleged defect is as follows:
 - *The SVs do not contain a defect.*
 - *The SVs meet or exceed all Federal Motor Vehicle Safety Standards (FMVSS).*
 - *The SVs pose no additional risk when meeting 3- and 6-year-old occupant FMVSS requirements.*

- *The OCS is proven through testing and peer comparison to work in “real world” situations.*
 - *The OCS “Adult lock” feature occurs after 60 seconds (and continues to be locked down to a level of 41 lbs. creating sufficient hysteresis).*
 - *The OCS has a built in natural latency of 1.5 seconds, to prevent reclassifications during momentary movements.*
 - *The OCS has been tested in panic stops, hard acceleration, hard turns, ditches/rough roads, and with various size adults seated in expected “comfort” positions.*
 - *The OCS locks the passenger classification prior to an impact when a vehicle deceleration greater than $> 1.5 G$'s is detected (for $> 2 ms$).*
- *The OCS functioned properly in the subject vehicle crash.*
 - *No air bag system issues were detected prior to the event.*
 - *Review of the EDR or PODS data showed no issues, and that the passenger air bag was suppressed prior to Event #2.*
 - *GM believes the passenger reached for the steering wheel after event #1 and moved out of position (which changed/suppressed the passenger air bag in the last few seconds prior to Event #2) and cites blood evidence on the driver bag from the passenger thumb injury in support of its assessment.*

Conclusion

The subject PODS-B OCS was widely used by GM and other OEMs across the time frame of interest. Based on the information provided and reviewed during the DP14-001 investigation, the passenger air bag OCS used in the MY 2006-2008 Impala and other vehicles does not appear to

contain a safety-related defect. NHTSA did not identify an issue with the subject MY 2008 Impala involved in the subject crash, nor has it identified a safety-related defect trend existing in the OCS used in the MY 2006-2008 Impala vehicles, in GM peer vehicles, or in other non-GM peer vehicles. Therefore, the petition is denied. However, the agency will continue to monitor this issue and take further action if warranted by changing future circumstances.

(Authority: 49 U.S.C. 30162(d); delegations of authority at CFR 1.50 and 501.8)

Jeffrey Mark Giuseppe,

Associate Administrator for Enforcement.

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