



U.S. Department of Transportation
National Highway Traffic Safety Administration

ODI RESUME

Investigation: PE24031
Prompted By: Standing General Order (SGO) Incident Reports
Date Opened: 10/17/2024 **Date:** 03/18/2026
Closed:
Investigator: Dylan Copestick **Reviewer:** Sharon Yukevich
Approver: Tanya Topka
Subject: FSD Collisions in Reduced Roadway Visibility Conditions

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Tesla, Inc.
Products: 2016-2024 Model S, X, 2017-2024 Model 3, 2020-2024 Model Y, 2023-2024 Cybertruck equipped with FSD
Population: 2,410,002 (Estimated)
Problem Description: Failure of the FSD’s degradation detection system, when encountering reduced roadway visibility conditions, to detect a degraded state and to warn the driver appropriately.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	EWR D&I	Other	Total	EWR Field Reports
All Incidents:	0	2	0	7	9	0
Crashes/Fires:	0	2	0	7	9	0
Injury Incidents:	0	0	0	2	2	0
Number of Injuries:	0	0	0	1	1	0
Fatality Incidents:	0	0	0	1	1	0
Number of Fatalities:	0	0	0	1	1	0

Description of Other:
 Crashes reported under the Standing General Order (SGO) or media reports.

ACTION/SUMMARY INFORMATION

Action: This (PE) Preliminary Evaluation has been upgraded to an Engineering Analysis.

Summary:
 On October 17, 2024, NHTSA’s Office of Defects Investigation (ODI) opened a Preliminary Evaluation (PE24031) of Tesla’s Full Self Driving Beta and Full Self Driving (Supervised) (collectively, FSD) to assess: the ability of the FSD system to detect and respond appropriately to reduced roadway visibility conditions; whether

any other FSD crashes had occurred under degraded roadway visibility conditions that are similar in nature to the four SGO-reported crashes identified in the opening document, and if so, the contributing circumstances for each of those crashes; and any updates or modifications by Tesla to the FSD system that may affect the performance of FSD in degraded roadway visibility conditions, including the timing, purpose, and capabilities of any such updates, and Tesla's assessment of their safety impact.

Tesla's FSD is an advanced driver assistance system (ADAS) that relies exclusively on vision-based cameras and the related FSD software to detect and respond to the roadway ahead, projecting a path forward based on traffic control devices, vehicles, pedestrians, and the roadway itself.

During this phase of the investigation, ODI reviewed the materials provided by Tesla detailing any actions taken, or changes, modifications, and updates made that may relate to the alleged defect. ODI reviewed information related to Tesla's transition to a vision-only perception system, and its deployment of the strategy in vehicles. ODI's findings include information on limitations of the vision-only perception system and updates made in response to known subject crashes.

When Tesla began transitioning away from using both cameras and radars to an exclusively camera-based approach, known as Tesla Vision, in mid-2021, it developed and implemented a degradation detection system that it deployed by a software update to existing and new Tesla vehicles. On June 28, 2024, the day after Tesla submitted the SGO report of the November 28, 2023 fatal crash listed in this document, Tesla began developing an update to the degradation detection system. ODI reviewed certain public statements, including those made during an April 2025 earnings call, in which Tesla stated that it had developed a breakthrough "direct photon-counting" capability that eliminates the degradation that the camera-based system experiences when glare is encountered. At this time, ODI does not have information on when the update was deployed and which vehicles have the updated system.

ODI has discussed individual incidents and its initial findings with Tesla. Based on Tesla's post-incident analysis, the update to the degradation detection system, had it been installed on the vehicles at the time, may have affected 3 of the 9 incidents identified by ODI. Review of Tesla's responses revealed additional crashes that occurred in similar environments and where the system either did not detect a degraded state, and/or it did not present the driver with an alert with adequate time for the driver to react. In each of these crashes, FSD also lost track of or never detected a lead vehicle in its path.

Tesla also described internal data and labeling limitations that prevented a uniform identification and analysis of crash events with the subject system engaged. ODI believes this limitation could have led to under-reporting of subject crashes over portions of the defined time-period.

Available incident data raise concerns that Tesla's FSD system fails to detect and/or warn the driver appropriately under degraded visibility conditions such as glare and airborne obscurants where the camera-based system performance degrades significantly. In the crashes that ODI has reviewed, the FSD system did not detect common roadway conditions that impaired its visibility and/or provide alerts when camera performance had deteriorated until immediately before the crash occurred.

ODI is upgrading this investigation (PE24031) to Engineering Analysis (EA) 26002 to further evaluate this matter.

The crashes included in the failure report summary can be found at NHTSA.gov under the following SGO report identification numbers: 13781-8004, 13781-7181, 13781-7381, 13781-7767, 13781-7964, 13781-8977, 13781-9267.