U.S. Department of Transportation

National Highway Traffic Safety Administration

ODI RESUME

OFFICE OF DEFECTS INVESTIGATION

NHTSA

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Investigation: EA 09-005
Prompted by: PE08-067
Date Opened: 04/01/2009 **Date Closed:** 04/03/2012
Investigator: Michael Lee **Reviewer:** Scott Yon
Approver: Frank Borris
Subject: Non-deployment of Side Thorax Air Bags

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: NISSAN NORTH AMERICA, INC.
Products: 2003-2005 Infiniti Q45 and 2003-2004 Infiniti M45
Population: 13,836

Problem Description: A faulty electrical connector in the side thorax air bag system causes the side air bag to become deactivated and the air bag warning lamp to illuminate. The affected side thorax air bag will not deploy as designed in moderate to severe side crashes.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	2	85	87
Crashes/Fires:	0	0	0
Injury Incidents:	0	0	0
Fatality Incidents:	0	0	0
Other*:	0	5,235	5,235

***Description of Other:** Warranty claims for side thorax air bag module/connector replacements.

ACTION / SUMMARY INFORMATION

Action: Close this Engineering Analysis (NHTSA Safety Recall No. 12V-079).

Summary:

The subject vehicles are equipped with seat-mounted, side thorax air bags for the driver and front passenger. This investigation revealed that faulty side air bag module electrical connectors located under the driver and front passenger seats can cause an interruption in the electrical circuit that will drop the input voltage below the specified range. As a result, the air bag warning lamp illuminates on the instrument panel and the affected side air bag becomes deactivated.

In June 2009, Nissan conducted a service campaign to repair the defective air bag electrical connectors in the subject vehicles (both Infiniti Q45 and M45 models). In June 2010, Nissan sent a second notification concerning the 2009 campaign to owners of vehicles that have not been remedied. Nissan is now conducting a safety recall of the Q45 vehicles not remedied under the service campaign (approximately 1,349 vehicles; see NHTSA Safety Recall No. 12V-079 for further details). The M45 vehicles are not included in the recall; however, Nissan is re-notifying owners of M45 vehicles that were not remedied under the previous service campaign. See attached report for more information.

A safety-related defect trend has not been identified in the Infiniti M45 vehicles at this time and further use of agency resources does not appear to be warranted. Accordingly, this investigation is closed. The closing of this investigation does not constitute a finding by NHTSA that no safety-related defect exists. The agency will monitor the issue and reserves the right to take future action if warranted by the circumstances.

The ODI reports cited above can be reviewed online at www-odi.nhtsa.dot.gov/complaints under the following identification (ODI) numbers: 10327196 and 10402282

Additional Information (EA09-005)

The rates of complaints and warranty claims related to the side thorax air bag connector issue are high. For example, Nissan submitted 5,235 warranty claims on 3,927 distinct subject vehicles out of 13,836 total subject vehicles, which yields a warranty rate of 38 claims per 100 vehicles for all claims and 28 claims per 100 vehicles for non-repeat claims. Also, the failure rates on the Q45 and M45 are not significantly different.

During this investigation, Nissan conducted side-impact crash tests of the subject vehicles with disabled side thorax air bags in order to evaluate the thoracic injury risk with the defect condition. The type of test conducted was the one specified by NHTSA's Federal Motor Vehicle Safety Standard (FMVSS) No. 214, "Side Impact Protection" applicable to the model year 2003-2005 light vehicles.[1] Also, during the development and testing of the subject vehicles, Nissan conducted the same type of crash test in which the side air bags deployed. The table below shows the results of these crash tests, specifically, the driver crash dummy's Thoracic Trauma Index (TTI), a thoracic injury measure expressed in Gs, by model and side thorax air bag (SAB) deployment status.

TTI of Infiniti Vehicles Tested with and without Side Air Bags

Vehicle Model	TTI for SAB deployed	TTI for SAB not deployed	Percent Increase in TTI
Q45	46	67	46
M45	40[2]	48	20

The TTI for the Q45 tested without the side air bag is 67, which is significantly higher than with side air bag deployment (46). Based on the thoracic injury risk curves[3], the difference in the TTIs represents a significant increase (a factor of about three) in the probability of Abbreviated Injury Scale 3 and 4 thoracic injuries. By contrast, the TTI for the M45 tested without the side air bag (48) is not significantly higher than with side air bag deployment (40) and does not result in a significant increase in injury risk.

ODI compared the crash test performance of the Infiniti vehicles with the defect condition (i.e., no side air bag deployment) to similar vintage large sedan vehicles (peer vehicles) tested by NHTSA's New Car Assessment Program (NCAP).[4] First, the TTI for the Infiniti vehicles were adjusted from the FMVSS 214 test speed of 33.5 mph to the NCAP test speed of 38.5 mph (as described in footnote 2). Accordingly, the adjusted TTIs for the Q45 and M45 tests without the

[1] This crash test involves a collision of a moving deformable barrier representing a 3,000-lb vehicle traveling at 33.5 mph into the side of a stationary vehicle. NHTSA requires the Thoracic Trauma Index injury measure not to exceed 85 Gs for the front seat occupied crash test dummies in 4-door passenger cars. See also 49 CFR 571.214 S51 (2003).

[2] This TTI is an adjusted value based on the TTI from a crash test conducted at a higher speed (38.5 mph) and the proportional relationship between the dummy's torso acceleration and kinetic energy.

[3] Kuppa, S., et al. (2003), "Development of Side Impact Thoracic Injury Criteria and their Application to the Modified ES-2 Dummy with Rib Extensions (ES-2re)," Stapp Car Crash Journal, Vol. 47 (Oct. 2003), page 11.

[4] NCAP conducts its crash tests at a speed of 38.5 mph instead of the 33.5 mph speed for the FMVSS 214 test.

side air bags are 88 and 63, respectively. ODI found the TTI for the Q45 without the side air bag is the highest (worst) when compared to the peer vehicles with side air bag deployment (i.e., the baseline for the non-defect condition). It is also higher than the only two peer vehicles tested by NCAP without the side air bag. The TTIs for the peer vehicles with side air bag deployment ranged from 36 to 70, and the two peer vehicles without the side air bag received TTIs of 67 and 70. In comparison, the TTI for the M45 without the side air bag is still within the range of the peer vehicles compared.

In addition, ODI reviewed the results of FMVSS 214 crash tests of similar vintage vehicles, which included mid-size and large cars. These test results were collected through information requests by NHTSA's Office of Vehicle Safety Compliance. Also, Nissan provided the results of FMVSS 214 tests of two similar vintage Nissan model vehicles. ODI found the TTI for the Q45 without the side air bag (67) is the highest when compared to the other vehicles tested with and without side air bags (TTIs for other vehicles ranged from 40 to 63). And again, the TTI for the M45 without the side air bag (48) is still within the range of the other vehicles compared.

In summary, ODI found there is a significant increase in the risk of serious thoracic injuries for the Infiniti Q45 vehicle without the side air bag during crash events of a magnitude as severe as the FMVSS 214 crash test, and the Q45 also performed poorly in comparison to its peer and other vehicles, while the Infiniti M45 displays neither of these characteristics. Based on this and the discussion above, NHTSA does not believe the defect condition, when it occurs in the M45, presents an unreasonable risk to motor vehicle safety within the meaning of the Safety Act.