



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

ODI RESUME

Investigation: PE04-021

Prompted By: Consumer complaints, Defect Petition (DP04-003) *dsy*

Date Opened: 03/03/2004

Date Closed: 07/22/2004 *7/18/2005*

Principal Investigator: Scott Yon

Subject: Throttle Control System

Manufacturer: Toyota Motor North America, Inc.

Products: MY 2002 - 2003 Toyota Camry, Solara (L4), and Lexus ES300

Population: 982,108

Problem Description: Complainants allege that the throttle control system fails to properly control engine speed resulting in vehicle surge.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	14	18	20
Crashes/Fires:	2	2	2
Injury Incidents:	0	0	0
# Injuries:	0	0	0
Fatality Incidents:	0	0	0
# Fatalities:	0	0	0
Other*:	0	43	43

*Description of Other: Warranty Claims

Action: A defect trend has not been identified; This Preliminary Evaluation has been closed.

Engineer: D. Scott Yon *DSY* - Amended 7/18/2005

Date: 07/22/2004

Div. Chief: Jeffrey L. Quandt

Date: 07/22/2004

Office Dir.: Kathleen C. DeMeter

Date: 07/22/2004

Summary: The Lexus models were the subjects of Defect Petition (DP) 04-003. Twelve ODI complaints are duplicative to Toyota reports, including the two minor crashes. The V6 equipped Solara models have been excluded because they do not contain the subject throttle control system.

Toyota introduced electronic throttle control (ETC) on the subject vehicles beginning in model year (MY) 2002. ODI opened the investigation to determine if the system could be the cause of complaints alleging the engine speed increased, or failed to decrease, (for a short duration) when the accelerator pedal was not depressed (the alleged defect). During the course of the investigation, ODI analyzed agency data and reviewed vehicle owner questionnaire (VOQ) reports, conducted interviews involving 113 VOQ and 36 Toyota reports, inspected two complainant vehicles, reviewed relevant Toyota service and new car feature documentation, reviewed and analyzed Toyota's responses to ODI's information request letter, conducted a limited control pedal assessment, and attended a Toyota technical presentation that included the assessment of two demonstration vehicles.

Through interviews, ODI identified 14 VOQ and 6 Toyota reports (20 unique vehicles) where complainants report multiple occurrences of the alleged defect. In some cases the condition was experienced by different vehicle operators or was witnessed by other occupants. ODI was unable to make a determination as to the cause of 9 Toyota and an additional 37 VOQ reports (which describe 28 unique incidents) due to insufficient information. The remaining complainants interviewed (62 VOQ, 21 Toyota) described conditions not caused by a failure of the throttle control system and were thus considered unrelated to the investigation. None of the complainants interviewed reported a component failure (or other indicator of a system failure) as the potential cause of incidents relevant to this investigation. In many cases, the complaint vehicles were subsequently inspected by dealership or manufacturer representatives who also failed to identify a fault within the vehicle. Toyota identified 43 related warranty claims, 24 of which were for diagnostic purposes only (no repairs performed). ODI found nothing abnormal in the control pedal configuration of the subject vehicles.

A defect trend has not been identified 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 a safety-related defect does not exist. The Agency will take further action if warranted by the circumstances. See the attached summary for further detail.

ALLEGED DEFECT

Allegations of A) an engine speed increase without the driver pressing on the accelerator pedal or, B) the engine speed failing to decrease when the accelerator pedal was no longer being depressed – both circumstances requiring greater than expected brake pedal application force to control or stop the vehicle and where the brake system functioned normally.

DISCUSSION

The investigation focused on the electronic throttle control (ETC) system and whether it may have been the source of consumer complaints of the alleged defect. The ETC system was one of several new or revised vehicle systems (including transmission and braking system) introduced for the MY 2002 subject vehicles. It consists of an accelerator pedal sensor (APS), a throttle control motor, a throttle position sensor (TPS), and the engine control module (ECM).

To control throttle position and monitor system operation, the system uses redundant hardware at the APS and TPS (main and sub sensor) and the ECM (main and sub processor). Redundant software strategies are also utilized between the two ECM processors. In the event an ETC system fault is detected by the ECM, a warning lamp is illuminated on the instrument panel and a diagnostic trouble code (DTC) related to the specific fault is stored in the ECM, as was demonstrated by Toyota during a June technical meeting (see the July 7, 2004 memo to file for further detail). ETC system diagnostics are reported by 23 DTC's.

When a fault is detected and depending on its nature, the ECM takes specific countermeasures (such as closing the throttle, or de-powering the throttle control motor) and then employs one of four failsafe modes of operation. Each mode has a specific effect on vehicle operation including: 1) operation at a slightly elevated idle speed (fixed throttle position, limp-off-road mode), 2) operation at limited power and delayed throttle response, 3) operation at idle speed only, or 4) engine shut down. Once employed, the failsafe mode remains in effect until the ignition key is turned off. Each failsafe mode was demonstrated during the technical meeting, and ODI notes that it was readily apparent from dash indications and substantial reduction in available throttle opening that the vehicle was operating in a failsafe condition.

At the close of this investigation, approximately 260 VOQ reports had been identified in the ODI database involving the subject vehicles and containing certain key words (e.g., surge, accelerate, throttle, crash, etc.) in the complaint description. Based on ODI review, 84 were found not to be related to the throttle control system because they involved unrelated matters such as transmission, engine control, or brake system issues. ODI selectively interviewed complainants, or other persons knowledgeable of a reported incident, for 113 of the VOQ reports.

ODI identified 14 reports involving 14 vehicles (ODI numbers listed below) where complainants report that the alleged defect occurred on multiple occasions (3 or more incidents) that in some cases were experienced by more than one vehicle operator or were witnessed by other occupants. Two minor crashes without injuries were reported. Complainants state that the incidents were of short duration (~5 seconds), occurred while the vehicle was in gear, moving at slow speeds or fully stopped, and that the brake was

effective in overcoming the engine. In some cases, the operator would take action to stop the vehicle from surging (shift to neutral and/or turn off the engine) while in other cases the vehicle returned to a normal state without any operator action. The incidents occur randomly and occurrences are often separated by long periods of time or mileage accumulation. ODI also identified 6 additional reports (6 unique vehicles, for a total of 20 vehicles) with the same circumstances from Toyota complainant interviews.

Through the interviews conducted ODI also identified 28 incidents from 37 VOQ reports (some duplicative, ODI numbers listed below) where a determination as to the cause could not be made due to insufficient information. The reports claim 21 crashes and no injuries; one VOQ (ODI 10065859) involved a fatal crash when a subject vehicle drove off the fourth floor of a parking garage killing the operator and the single passenger. Complainants report the occurrence of a single incident that often occurs during close quarters vehicle maneuvering (e.g., parking or entering a garage) and thus often results in a crash. During interviews, many complainants are unsure of the details that led up to the incident, such as the position of their right foot and which pedal, if any, they may have actuated or attempted to actuate; a crash occurs and in the aftermath the operator believes it was caused by the vehicle. In some cases the complainant continues to own and operate the vehicle on a regular basis, often through long periods and distances, without further incident. ODI also identified 9 reports (involving 3 crashes and one injury) with the same circumstances from Toyota complainant interviews.

ODI eliminated 62 VOQ and 21 Toyota complaints through the interviews conducted because the circumstances described in the interview could not be explained, or solely explained, by a failure of the ETC system.

ODI failed to find any evidence in the interviews conducted (113 VOQ and 36 Toyota reports, 149 total), or in the information provided in Toyota's IR response, of instrument panel warning lamp illumination or ETC diagnostic codes detection. None of the complainants interviewed described conditions similar to failsafe mode operation. One report (10062931) was found where an ETC component replacement occurred in connection with a repair attempt related to the alleged defect, no others were found. Toyota's warranty claim rate is low with 24 of the 43 warranty claims submitted involving diagnostic repairs (that did not result in component replacement because no fault was detected). Many warranty claims were not related to the alleged defect. Toyota's ETC parts sales rate for the subject vehicles is low also. There are no service bulletins or campaigns that relate to the alleged defect.

VOQ numbers: 6900639, 10026512, 10055375, 10060785, 10060806, 10060886, 10062072, 10062212, 10062931, 10063035, 10063095, 10071432, 10073842, 10073900.
37 indeterminate: 8013543, 8015215, 10008367, 10026392, 10045644, 10045944, 10048030, 10053774, 10061716, 10061725, 10061737, 10061753, 10061791, 10062013, 10062702, 10062892, 10062956, 10062975, 10063340, 10065859, 10066756, 10067011, 10067142, 10067327, 10067780, 10068089, 10071703, 10072208, 10072248, 10072621, 10072722, 10073382, 10073396, 10073435, 10074340, 10080050, 10080160