

Yon, Scott (NHTSA)

From: Subbalaiah V. Malladi [subbalaiah@exponent.com]
Sent: Monday, June 28, 2010 2:15 AM
To: Quandt, Jeff (NHTSA); Yon, Scott (NHTSA)
Subject: ETCSi Warranty Data
Attachments: ETCS-i warranty request-dsy20100511.doc; NHTSA_logic.doc; TargetPartsList.xls; ETC_Warranty_Data_Summary_US.xls; DiagnosticWarrantyDiagnostic Operation Codes - UPDATED.doc

Dear Jeff and Scott:

As per our recent discussions, I am enclosing a set of files with the warranty analysis and data you requested. As in the past, please treat this as Toyota Confidential, pending the review and follow-up by Toyota personnel and their lawyers.

Even the compressed Access database is about 92MB. As a result, you need to download it from the above file transfer link. Please don't hesitate to call me if you have any questions or comments. I hope this work product will save you time and effort in your further analysis of this data.

Regards,

Subbalaiah

Steps taken to create NHTSA Request for Warranty data with parts or DTC criteria.

1. TMS warranty data for all Toyota, Lexus & Scion vehicles, model years 1998-2010 were analyzed. All repair records for these vehicles was included through 5-13-2010.
2. Data was filtered to include only ETCS-i vehicles based on delineation provided by Toyota. If ETCS-i usage for a specific make/model/year/engine was ambiguous, the combination was assumed to contain ETCS-i technology.
3. Vehicles not sold in the US were removed. Less than 2% of the claims involved vehicles sold outside the U.S.
4. Selected all parts with descriptions possibly related to the 5 components in the NHTSA request (attached). Per verbal request by Jeff Quandt and Scott Yon, Oxygen sensor repairs were included. The list thus comprised: Accelerator Pedal; Throttle Body; ECU; Wiring Harness; Connectors; Oxygen Sensor. Parts list was then reviewed by engineers for relevance. If relevance of a part was unknown (for example some wiring harnesses or connectors), those parts were assumed to be relevant. For a detailed listing of the parts included, please refer to the attached parts list.
5. Per NHTSA's request, repair records for the recalls on the Pedal and Floor Mat were filtered out. This was done using the Repair Program field, which contains numbers for all recall programs. Recall numbers for Pedal and Floor mat were identified and associated repair records for these recalls were filtered out. Note that all repairs with a target part were included with the exception of the Pedal and Floor Mat recalls.
6. The database was queried for the 29 DTCs on the attached list (referenced in the NHTSA request). Two search strategies were employed to extract records with a target DTC :

- i) The condition, cause, and remedy text fields were searched for the 29 DTC numbers using wildcards. For example, DTC P0121 was searched using *0121* where * = wildcard.
 - (1) The resulting records were then queried further to identify valid DTCs (e.g., P0121, PO121, P 0121, P O121 were all considered valid DTC codes). All such records were considered "Valid" and were included without further review.
 - (2) The remaining records that did not meet the "valid DTC" criteria were then queried for TSB or recall involvement other than the recalls mentioned in step 5 above.
 - (a) Records that could readily be identified as a specific TSB number were excluded (e.g., the string "TSB-0121-08" was excluded since it is obvious that it is not related to DTC P0121).
 - (b) Records that could not be readily identified as relating to a TSB, and all other recall records that shared the same number as a valid DTC, were individually read and relevant records were identified.
 - ii) A separate file was received from Toyota that contained Claim Number and up to 5 DTC codes per claim. This file primarily included repairs dated after 2005. The file was linked to the master warranty data and queried for the 29 requested DTCs. The resulting records were compared to the target records prepared in 1-6 above, and records not already included were added to the file. However, the relevant DTC codes from this file are included in the database as [DTC_#], even if they are already tagged from the text fields.
7. Structure of data file "ETC Warranty Data US.mdb". This MS Access database contains all the warranty records resulting from the analysis in steps 1-6 above. There are 670,677 records in the file. The associated part group described in step 4 is named [Part Group]. Individual replacement part numbers and their descriptions can be found in the fields [Part_No] & [PartDesc]. The database is parts-based, so more than one record is possible for a given claim. If [PartGroup] is null, the record was selected based on a match to one of the target DTCs as described in step 6.
- There are 2 sets of DTC fields: The DTCs extracted from the text can be found in the fields named [DTC#_TextFields] and the DTCs from the separate file described in 6.ii above are in the fields named [DTC_#]. For many records, the same DTC code appears in both the [DTC#_TextFields] and [DTC_#]. The query used to generate the summary file named "ETC_Warranty_Data_Summary_US.xls" is named "ComponentSummary".

Steps taken to create NHTSA Request for Warranty data with parts or DTC criteria.

1. TMS warranty data for all Toyota, Lexus & Scion vehicles, model years 1998-2010 were analyzed. All repair records for these vehicles was included through 5-13-2010.
2. Data was filtered to include only ETCS-i vehicles based on delineation provided by Toyota. If ETCS-i usage for a specific make/model/year/engine was ambiguous, the combination was assumed to contain ETCS-i technology.
3. Vehicles not sold in the US were removed. Less than 2% of the claims involved vehicles sold outside the U.S.
4. Selected all parts with descriptions possibly related to the 5 components in the NHTSA request (attached). Per verbal request by Jeff Quandt and Scott Yan, Oxygen sensor repairs were included. The list thus comprised: Accelerator Pedal; Throttle Body; ECU; Wiring Harness; Connectors; Oxygen Sensor. Parts list was then reviewed by engineers for relevance. If relevance of a part was unknown (for example some wiring harnesses or connectors), those parts were assumed to be relevant. For a detailed listing of the parts included, please refer to the attached parts list.
5. Per NHTSA's request, repair records for the recalls on the Pedal and Floor Mat were filtered out. This was done using the Repair Program field, which contains numbers for all recall programs. Recall numbers for Pedal and Floor mat were identified and associated repair records for these recalls were filtered out. Note that all repairs with a target part were included with the exception of the Pedal and Floor Mat recalls.
6. The database was queried for the 29 DTCs on the attached list (referenced in the NHTSA request). Two search strategies were employed to extract records with a target DTC :
 - i) The condition, cause, and remedy text fields were searched for the 29 DTC numbers using wildcards. For example, DTC P0121 was searched using *0121* where * = wildcard.
 - (1) The resulting records were then queried further to identify valid DTCs (e.g., P0121, PO121, P 0121, P O121 were all considered valid DTC codes). All such records were considered "Valid" and were included without further review.
 - (2) The remaining records that did not meet the "valid DTC" criteria were then queried for TSB or recall involvement other than the recalls mentioned in step 5 above.
 - (a) Records that could readily be identified as a specific TSB number were excluded (e.g., the string "TSB-0121-08" was excluded since it is obvious that it is not related to DTC P0121).
 - (b) Records that could not be readily identified as relating to a TSB, and all other recall records that shared the same number as a valid DTC, were individually read and relevant records were identified.
 - ii) A separate file was received from Toyota that contained Claim Number and up to 5 DTC codes per claim. This file primarily included repairs dated after 2005. The file was linked to the master warranty data and queried for the 29 requested DTCs. The resulting records were compared to the target records prepared in 1-6 above, and records not already included were added to the file.

However, the relevant DTC codes from this file are included in the database as [DTC_#], even if they are already tagged from the text fields.

7. Structure of data file "ETC Warranty Data US.mdb". This MS Access database contains all the warranty records resulting from the analysis in steps 1-6 above. There are 670,677 records in the file. The associated part group described in step 4 is named [Part Group]. Individual replacement part numbers and their descriptions can be found in the fields [Part_No] & [PartDesc]. The database is parts-based, so more than one record is possible for a given claim. If [PartGroup] is null, the record was selected based on a match to one of the target DTCs as described in step 6. There are 2 sets of DTC fields: The DTCs extracted from the text can be found in the fields named [DTC#_TextFields] and the DTCs from the separate file described in 6.ii above are in the fields named [DTC_#]. For many records, the same DTC code appears in both the [DTC#_TextFields] and [DTC_#]. The query used to generate the summary file named "ETC_Warranty_Data_Summary_US.xls" is named "ComponentSummary".
-

Diagnostic Operation Codes

These are operation codes that dealers use to collect for diagnostic time. The codes are based on the number that the scan tool reports to the technician.

DP0121	Throttle/Pedal Position Sensor/Switch - "A" Circuit Range/Performance Problem
DP0122	Throttle/Pedal Position Sensor/Switch - "A" Circuit Low Input
DP0123	Throttle/Pedal Position Sensor/Switch - "A" Circuit High Input
DP0222	Throttle/Pedal Position Sensor/Switch - "B" Circuit Low Input
DP0223	Throttle/Pedal Position Sensor/Switch - "B" Circuit High Input
DP0500	Vehicle Speed Sensor Malfunction
DP0503	Vehicle Speed Sensor - "A" Intermittent/Erratic/High
DP0504	Brake Switch - "A"/"B" Correlation
DP0505	Idle Control System Malfunction
DP1121	Accelerator Pedal Position Sensor - Range/Performance Problem
DP1125	Throttle Control Motor Circuit Malfunction
DP1127	ETCS Actuator Power Source Circuit Malfunction
DP1128	Throttle Control Motor Lock Malfunction
DP1129	Electric Throttle Control System Malfunction
DP1607	Cruise Control Input Processor
DP1633	ECM Malfunction (ETCS Circuit)
DP2102	Throttle Actuator Control Motor - Circuit Low
DP2103	Throttle Actuator Control Motor - Circuit High
DP2111	Throttle Actuator Control System - Stuck Open
DP2112	Throttle Actuator Control System - Stuck Closed
DP2118	Throttle Actuator Control Motor - Current Range/Performance
DP2119	Throttle Actuator Control Throttle Body Range/Performance
DP2120	Throttle/Pedal Position Sensor/Switch - "D" Circuit
DP2121	Throttle/Pedal Position Sensor/Switch - "D" Circuit Range Performance
DP2122	Throttle/Pedal Position Sensor/Switch - "D" Circuit Low Input

DP2125	Throttle/Pedal Position Sensor/Switch - "E" Circuit	
DP2127	Throttle/Pedal Position Sensor/Switch - "E" Circuit Low Input	
DP2128	Throttle/Pedal Position Sensor/Switch - "E" Circuit High Input	
DP2135	Throttle/Pedal Position Sensor/Switch - "A"/"B" Voltage Correlation	