



AUTOMOTIVE SYSTEMS ANALYSIS, INC.
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FORENSIC ANALYSIS OF ELECTRONIC AND COMPUTER VEHICLE CONTROLS

Ms. Nancy Lummen Lewis
Associate Administrator for Enforcement
National Highway Traffic Safety Administration
Attn: Recall Management Division (NVS-215)
1200 New Jersey Ave, SE
Washington, D.C. 20590

APR 29 2013

Re: Toyota Prius Steering, Upper Intermediate Extension Shaft #2, Manufacturing Defect
w/resp/to Recall 12V-537 (Lower Intermediate Extension Shaft #1, Manufacturing Defect)

Vehicle: [REDACTED] Subject Vehicle 2005 Toyota Prius
VIN: JTDKB20U953 [REDACTED] MfgDt 10/04
Issue: Alleged Steering Malfunction

Dear Ms. Lewis:

1. At the request of the owner, [REDACTED] on 4Jan13, I flew to Jacksonville FL Naval Air Station (JAX, NAS), and inspected his subject vehicle in the base impound lot. My activities included an inspection of the occupant compartment steering column components [no lift was available to allow for inspection of the lower components] and retrieval of ECM and SRS data. The steering wheel was shown by [REDACTED] to rotate multiple turns, in both directions, with no resistance. A key part of my inspection was to see if the prior-applied steering Recall [fix for improperly manufactured steering column lower intermediate shaft #1] was still intact or whether a failure of Recall 12V-537 was the cause of the current loss of steering issue.
2. My inspection revealed that the current loss of steering issue was caused by a catastrophic failure of the upper steering intermediate shaft [steering upper intermediate shaft #2]. The upper steering intermediate shaft [steering intermediate shaft #2] was decoupled from the electric-power-assist column output spline. A careful examination of the decoupled components revealed that for an extended period of time, the upper steering intermediate shaft had not been properly installed on the spline output of the power assist column. This allowed a metallurgical failure [spline wearout] on the interior of the upper

steering intermediate shaft #2 which consequently allowed separation of that shaft from the electrical steering power assist column. My examination of that shaft spline showed a long term deterioration of the upper intermediate shaft #2 inside spline as evidenced by metallurgical shards of deteriorated spline metal still residing in the upper intermediate shaft cavity.

3. My full report, attached, documents photographic and mechanical evidence confirming my observations and confirming that the upper steering intermediate shaft had not been properly installed on the spline output of the power assist column. My report also shows, for an exemplar vehicle, a correct upper steering intermediate shaft #2 installation on the power assist column output spline.
4. I know of no intervening repair to the upper steering intermediate shaft between the time of vehicle manufacture and my inspection. The Recall procedure [for the lower intermediate steering shaft #1] specifically instructs technicians to avoid any operations on the upper intermediate shaft #2.
5. Thus, with a reasonable degree of engineering and scientific certainty, my conclusion, drawn from these facts, is that the [REDACTED] subject vehicle steering column linkage was improperly assembled at its original manufacturing point and thus contained a latent manufacturing defect. This manufacturing defect is a complementary, but wholly different, manufacturing defect than is described and illuminated in Recall 12V-537 and the service instructions to remediate that condition.
6. The net instruction from this conclusion is that there was a gap in Toyota quality control - in a mission-critical system [steering column linkage]. Had such a defect manifested itself under highway speed conditions, significant and severe injuries may have ensued to the driver and occupants of the Prius and quite possibly to other vehicles and occupants. Thus, this situation affects public highway traffic safety.
7. These facts now suggest that the vehicle manufacturer be tasked to investigate how their manufacturing quality control function missed this steering column linkage assembly defect and how many other similar steering mis-assembly defects exist in the Prius consumer usage world [for vehicles manufactured under similar circumstances].

Respectfully submitted,



William Rosenbluth



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Jacksonville FL

O:

e-mail;

Re: Caption: // Toyota Motor Corp
Vehicle: 2005 Toyota Prius
VIN: JTDKB20U953 MfgDt 10/04
Issue: Alleged Steering Malfunction
Incident:
Veh Secured: Yes, Plaintiff, @ JAX NAS
ASA Assignment: Analysis of Claim, Recordation of event & Artifact Data

A. Background

narrates that;

I was an avid follower of the Toyota Prius hybrid and ordered one as soon as possible. But, living in San Diego (Southern California), there was a lot of demand and I had to wait more than one year to take delivery of a Prius in November 2004 (a 2005 vehicle). Although I loved the vehicle and was excited to be driving one, I experienced three problems that Toyota stated they knew nothing about and the Toyota dealer said they could not replicate:

- 1) The cruise control would cancel but not re-engage (ironic since the most recent problem was that the cruise wouldn't disengage)*
- 2) The car would drift off course whenever I took my eyes off the road for even a moment (e.g., to tune the radio); over time, I learned that I had to steer the car constantly or it would drift into another lane (apparently this is due to a computer algorithm that attempts to correct for wind and road surface anomalies).*
- 3) The radio reception was poor.*

Within the first year, Toyota issued a safety recall for the [steering, lower] intermediate shaft but the dealer discounted the necessity and stated that, even if I never brought the vehicle in for the recall, it wouldn't make any difference (it was an "over-kill" reaction by Toyota). I ignored that advice and scheduled the recall along with an oil and filter change. I don't know how long this should have taken but the car was ready for me within a short time so I question whether or not the safety recall was ever actually conducted.



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Here's what happened: I was driving on the Interstate with the cruise control set at 70 mph. Seeing traffic stopped ahead, I applied the brakes for a moment to slow, then released the brake to coast. Much to my surprise, the cruise control was still engaged and the car accelerated. I applied the brakes again, manually turned off the cruise control, then was able to coast. I drove for another half-hour without incident until the following afternoon when I drove again, experiencing a much more serious problem. I had just turned left, and was straightening the wheels (turning the steering wheel back right) [to enter a parking spot] when I heard, and felt, a loud "snap" in the steering wheel, immediately upon which I knew the steering wheel was disconnected and I could no longer steer the car. Very, very fortunately, and only because I was already nearly stopped, I was able to stop the vehicle without incident. However, I immediately recognized that, had this happened in almost any other scenario than being nearly parked, the outcome would have been markedly different. The steering wheel is completely loose, not controlling anything, and all the many steering wheel controls are equally disconnected, including the driver's air bag (SRS), something that I would have needed, but wouldn't have worked, had I crashed into oncoming traffic or an Interstate median. Had I not decided to run a frivolous and unnecessary errand, I would have otherwise been on the Interstate, rushing home for Thanksgiving like many others, but now am merely stranded, in a motel, far from home in Jacksonville, FL, wondering what to do next. My low mileage (just 27,773 mi), seven year old Prius is still parked, undriveable, {taken from CAS statement as supplied by [REDACTED]}.

[REDACTED] reported his steering problem to NHTSA on 25Nov2011. Exhibit A.1 shows this NHTSA VOQ submission #10437229, dated 25Nov11.

Exhibit A.2 shows the [only known] NHTSA response to [REDACTED] dated 19Oct2012.

B. Subject Vehicle Inspection and Global Opinions

1. On 4Jan13, I flew to Jacksonville FL Naval Air Station (JAX, NAS), and inspected the subject vehicle in the base impound lot. My activities included an inspection of the occupant compartment steering column components [no lift was available to allow for inspection of the lower components] and retrieval of ECM and SRS data. The steering wheel was shown by [REDACTED] to rotate multiple turns, in both directions, with no resistance. A key part of my inspection was to see if the prior-applied steering Recall [fix for improperly manufactured steering column lower intermediate shaft #1] was still intact or whether a failure of that Recall was the cause of the current loss of steering issue.
2. My inspection revealed that the current loss of steering issue was caused by a catastrophic failure of the upper steering intermediate shaft [steering upper intermediate shaft #2]. The upper steering intermediate shaft [steering intermediate shaft #2] was decoupled from the electric-power-assist column output spline. A careful examination of the decoupled



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components revealed that for an extended period of time, the upper steering intermediate shaft had not been properly installed on the spline output of the power assist column. This allowed a metallurgical failure [spline wearout] on the interior of the upper steering intermediate shaft #2 which consequently allowed separation of that shaft from the electrical steering power assist column. My examination of that shaft spline showed a long term deterioration of the upper intermediate shaft #2 inside spline as evidenced by metallurgical shards of deteriorated spline metal still residing in the upper intermediate shaft cavity.

3. In Section C below I show photographic and mechanical evidence confirming my observations and confirming that the upper steering intermediate shaft had not been properly installed on the spline output of the power assist column. In Section C below I also show, for an exemplar vehicle, a correct upper steering intermediate shaft #2 installation on the power assist column output spline.
4. I know of no intervening repair to the upper steering intermediate shaft between the time of vehicle manufacture and my inspection. The Recall procedure [for the lower intermediate steering shaft #1] specifically instructs technicians to avoid any operations on the upper intermediate shaft #2.
5. Thus, with a reasonable degree of engineering and scientific certainty, my conclusion, drawn from these facts, is that the ██████████ subject vehicle steering column linkage was improperly assembled at its original manufacturing point and thus contained a latent manufacturing defect. This manufacturing defect is a complementary, but wholly different, manufacturing defect than is described and illuminated in Recall 12V537 and the service instructions to remediate that condition.
6. The net instruction from this conclusion is that there was a gap in Toyota quality control - in a mission-critical system [steering column linkage]. Had such a defect manifested itself under highway speed conditions, significant and severe injuries may have ensued to the driver and occupants of the Prius and quite possibly to other vehicles and occupants. Thus, this situation affects public highway traffic safety.
7. These facts now suggest that the vehicle manufacturer be tasked to investigate how their manufacturing quality control function missed this steering column linkage assembly defect and how many other similar steering mis-assembly defects exist in the Prius consumer usage world [for vehicles manufactured under similar circumstances].

C. Basis of Subject Vehicle Global Opinions



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1. On 4Jan13, I flew to Jacksonville FL Naval Air Station (JAX, NAS), and inspected the subject vehicle (SV) in the base impound lot. My activities included retrieval of ECM and SRS data and an inspection of the occupant compartment steering column components [no lift was available to allow for inspection of the lower components]. On immediate vehicle viewing, the subject vehicle steering wheel was shown by [REDACTED] to rotate multiple turns, in both directions, with no resistance and no response of the front wheels. I made a video of that demonstration. Exhibit C.1 shows the SV as found. Note the upper intermediate steering shaft #2 seen hanging over brake pedal.
2. My first inspection step was to interrogate the ECM [engine control computer] with OBD2Spy v4.12 and AutoEnginuity V11.0 scanners. The ECM evidenced no DTCs and no Freeze Frame data on either scanner. See Exhibit C.2.
3. Next, the SRS ECU [EDR] was interrogated with AutoEnginuity V11.0 scanner and a Bosch CDR v 8.10. No event data was saved in the EDR. DTCs B1801 [Driver Squib Stage 1 = open] and DTC B1811 [Driver Squib Stage 2 = open] were retrieved from the SRS ECU. These are entirely consistent with the unrestricted steering wheel which clearly ruptured the clockspring [used to connect to driver airbag squib 1 and squib 2]. See Exhibit C.3.
4. The steering column linkage in the subject 2005 Prius consists of two intermediate shafts and an electric power assist top column. Exhibit C.4.1 shows the upper half of the steering column linkage and Exhibit C.4.2 shows the lower half of the steering column linkage.
5. The subject 2005 Prius is subject to recall COT [NHTSA 12V-537], "Steering Intermediate Extension Shaft May Fail". This Recall concerns the lower steering intermediate shaft [#1] and the potential for an improper-metallurgy shaft to fail. Exhibit C.5.1 shows the customer notice for Recall 12V-537. Exhibit C.5.2 shows an excerpt of the technician service instructions which depict the lower steering intermediate shaft [#1] in detail.
6. [REDACTED] thought he had the Toyota steering Recall applied 12Dec2006 by Frank Toyota. Exhibit C.6.1 appears to confirm this steering Recall application. However, in a current service record retrieval by the same dealer, Exhibit C.6.2, the current [Jan 2013] Toyota vehicle database shows that the Steering Recall was not applied.
7. I next confirmed that the SV steering column had lost all integrity [steering wheel free to turn with no restrictions or stops]. This is also recorded on video with [REDACTED] demonstrating this condition.



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8. Inspecting the upper column for possible causes of this, I found that the upper steering intermediate shaft [#2] had separated from the exit spline of the power assist column output. This separation had no observable or known intervening cause such as a collision or abusive usage. The upper steering column intermediate shaft #2 separation is not part of the Toyota Steering Recall 12V-537 or any of its predecessor versions. See Exhibit C.8.
9. Exhibit C.9 shows the upper mating end of the upper end of the upper steering intermediate shaft #2 and the fact that its internal splines are mechanically worn away for approximately 1/4 of the intended mating distance [with the power assist exit spline]. It should be noted that the upper intermediate shaft #2 is actually part of a sliding link, and the malfunction portion was intended by design to have been locked onto the power assist exit spline. This lock function is accomplished by its affixing bolt occupying the machined annulus in the power assist exit spline, as well as 'cinching up' the intermediate shaft #2 internal spline connection [this is a venerable mechanical design, conceptually similar to the manner in which many bicycle pedals are locked onto the bicycle drive gear axle]. There was no deformation of the power assist exit spline indicating a possible drag-over of the locking bolt.
10. Since the locking bolt was found intact in the intermediate shaft, and was no deformation of the power assist exit spline indicating a possible drag-over, the locking bolt could not ever have been properly locked onto the power assist exit spline. Additionally, a careful examination of location of the rust marks on the power assist exit spline show that the upper intermediate shaft #2 was only installed on approximately the first third of the power assist exit spline. Its intended design [based on proper locking bolt position would have been for complete coverage of the upper intermediate shaft #2 spline with the power assist exit spline - with the locking/cinching bolt residing in the power assist exit spline annulus. Exhibit C.9 shows the SV bolt and the power assist exit spline annulus.
11. Exhibit C.9 also shows that the worn section of the upper intermediate shaft #2 spline coincides with the approximate [NON-rust mark delineated, covered] portion of the power assist exit spline.
12. The evidence presented above appears compelling, but as a hypothesis, it must be tested against design intent reality. I did that on 8Jan13 using an exemplar 06Prius vehicle.¹

¹

To confirm the applicability of my exemplar, I checked the part #s of the OEM upper steering intermediate shaft #2 for both model years. It turns out that Toyota installed a new P/N 45260-47052 on vehicle production after Nov05 and specified that same P/N as superceding the OEM shaft P/N for any replacements on 2005 MY vehicles. Thus the mechanical design for both model years is by definition, identical.



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Exhibit C.12 is a photo sequence showing that exemplar vehicle and its upper intermediate steering shaft #2 assembly on the exemplar power assist exit spline annulus. These photos clearly show, with no ambiguity, that a proper installation includes the cinching bolt properly residing in the power assist exit spline annulus.

13. Thus, barring evidence of an intervening cause, the above investigation supports, with a reasonable degree of engineering and scientific certainty, my conclusion that the [REDACTED] subject vehicle was improperly assembled at its original assembly plant and thus contained a manufacturing defect which was not identified or remedied by Toyota Quality Control. This is a complementary, but wholly different, manufacturing defect then that illuminated in Recall 12V-537 [and all prior versions of that Recall]..
14. The net instruction from this conclusion is there was an undefendable gap in Toyota quality control - in a mission-critical system [steering column linkage]. Had such a defect manifested itself under highway speed conditions, significant and severe injuries may have ensued to the driver and occupants of the Prius and quite possibly to other vehicles and occupants. Thus, this situation affects public highway traffic safety.
15. These facts now suggest that the vehicle manufacturer be tasked to investigate how their manufacturing quality control function missed this steering column linkage assembly defect and how many other similar steering mis-assembly defects exist in the Prius consumer usage world [for vehicles manufactured under similar circumstances].

Respectfully Submitted

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Exhibit A.1 report of steering problem to NHTSA on 25Nov2011.

U.S. Department of Transportation National Highway Traffic Safety Administration		DOT Auto Safety Hotline Vehicle Owner's Questionnaire To Report Vehicle Safety Defects 1-888-DASH-2-DOT (1-888-327-4236) INTERNET: www.nhtsa.dot.gov/hotline		FOR AGENCY USE ONLY 100148	
Name		Date Received 25-NOV-2011		Repository ☐	
Address		Daytime Telephone Number		Reference No. 10437229	
City WEST LAFAYETTE		State IN		Zip Code	
Evening Telephone Number		E-mail Address			
The information you provide will be used to identify potential safety related defects. We may share your information with the applicable vehicle manufacturer during an investigation or recall in accordance with the routine uses described in the agency's Privacy Act notice. See 49 FR 53877 (Sep. 3, 2004).					
VEHICLE INFORMATION					
17 digit Vehicle Identification Number located at bottom of windshield on driver's side JTDKB20U953		Make TOYOTA		Model PRIUS	
Model Year 2005		Date Purchased NOV 15, 2004		Dealer's Name and Telephone Number Kearny Mesa Toyota	
Original Owner ☒		Dealer's City San Diego		State CA	
Zip Code 92111		Engine No. Cylinders 4		Fuel Type: GAS	
Transmission Type CVT		☒ Antilock Brakes ☒ Cruise Control		Powertrain	
Multiple Failure CRUISE CONTROL STEERING		Incident Date(s) 22-NOV-2011 23-NOV-2011			
FAILED COMPONENT(S) / PART(S) INFORMATION					
Vehicle Component Codes: 180000 VEHICLE SPEED CONTROL 010000 STEERING				Failure Mileage 27,773	
Failure Speed 70					
ADDITIONAL ITEMS TO BE COMPLETED WHEN REPORTING A TIRE FAILURE					
Tire Make		Tire Model (Name or Number)		Tire Size (Example P215/65R15)	
DOT No. (Example: DOTM4SABC036)		☐ Original Equipment ☐ Prior Repair		Failure Location:	
Tire Component Code		Tire Failure Type:			
ADDITIONAL ITEMS TO BE COMPLETED WHEN REPORTING A CHILD SEAT FAILURE					
Make:		Date Manufactured:		Model No./Name:	
Seat Type:		Installation System:			
Child Seat Component Code:		Failed Part:			
APPLICABLE INCIDENT INFORMATION					
(Please describe in detail the incident(s), failure(s), and circumstances.)					
Crash ☐ Yes ☒ No		Number of Persons Injured		Number of Deaths	
Fine ☐ Yes ☒ No		Reported to Police		N	
Narrative Description of Incident(s), Crash(es), and Injury(ies) Please describe (1) events leading up to the failure, (2) failure and its consequences, and (3) what was done to correct the failure, i.e. parts repaired or replaced and if old part is available.					
TL* THE CONTACT OWNS A 2005 TOYOTA PRIUS. THE CONTACT STATED THAT WHILE DRIVING APPROXIMATELY 70 MPH WITH THE CRUISE CONTROL ACTIVATED, HE APPLIED THE BRAKE PEDAL IN AN ATTEMPT TO DEACTIVATE THE CRUISE CONTROL. THE CRUISE CONTROL WOULD NOT DEACTIVATE AND THE CONTACT HAD TO MANUALLY DEACTIVATE THE CRUISE CONTROL SYSTEM. THE CONTACT ALSO STATED THAT HE HEARD A SHAPPING SOUND COMING FROM THE STEERING WHEEL WHILE ATTEMPTING TO PARK AT 5 MPH. THIS FAILURE OCCURRED THE DAY AFTER THE CRUISE CONTROL FAILURE. THE STEERING WHEEL THEN BECAME LOOSE AND THE CONTACT HAD DIFFICULTY STEERING THE VEHICLE. THE VEHICLE WAS NOT TAKEN TO THE DEALER FOR A DIAGNOSTIC TEST. THE VEHICLE WAS NOT REPAIRED. THE APPROXIMATE FAILURE MILEAGE WAS 24,000. THE VIN WAS NOT AVAILABLE. Contact Update Report states that I "had difficulty steering the vehicle" when in fact I was "completely unable to steer the vehicle." The vehicle has not been taken to a dealer, nor yet repaired, as I was hoping that the DOT - NHTSA might want to see & analyze & evaluate this vehicle before Toyota gets to it. Please let me know ASAP if you would like to see the vehicle. Thank you! There weren't any injuries / deaths only because the catastrophic failure of the steering wheel just happened					
Include, if available: Police/Fire Department Report, Photos, and Repair Invoice					
ATTACH ADDITIONAL SHEETS IF NECESSARY					
The Privacy Act of 1974 (Public Law 93-579) This information is requested pursuant to authority vested in the National Highway Traffic Safety Administration and subsequent amendments. You are under no obligation to respond to this questionnaire. Your response may be used by NHTSA in determining whether a manufacturer should take appropriate action to correct a safety defect. If the NHTSA proceeds with administrative enforcement or litigation against a manufacturer, your response or a statistical summary thereof, may be used in support of the agency's action.					



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Exhibit A.2 NHTSA response to 19Oct12.

From: <Stephen.McHenry@dot.gov>
Subject: Toyota Prius report filed with NHTSA, #10437229
Date: October 19, 2012 4:36:07 PM EDT
To: [REDACTED]

[REDACTED]

My name is Stephen McHenry, I am an investigator with the National Highway Traffic Safety Administration of the US Department of Transportation. I am interested in the report you filed with us regarding your 2005 Prius steering system problem. Your report and the material you submitted was very detailed, thank you for taking the time to file it with us. What was the final resolution to the problem: did a dealership or mechanic correct the problem? Did they fix it by performing a recall or was some other work done? Is there anything else you can tell me would be helpful in understanding the problem you experienced?

Stephen McHenry
Investigator, US D.O.T.
National Highway Traffic Safety Administration
Office of Defects Investigation
NVS-213 Room W48-308
1200 New Jersey Ave., SE
Washington D.C. 20590-0001
202.366.4883 or 1.877.536.8368 x-64883
Fax 202.366.1767

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Exhibit C.1 The SV as found.



Note the upper intermediate steering shaft #2
hanging over brake pedal

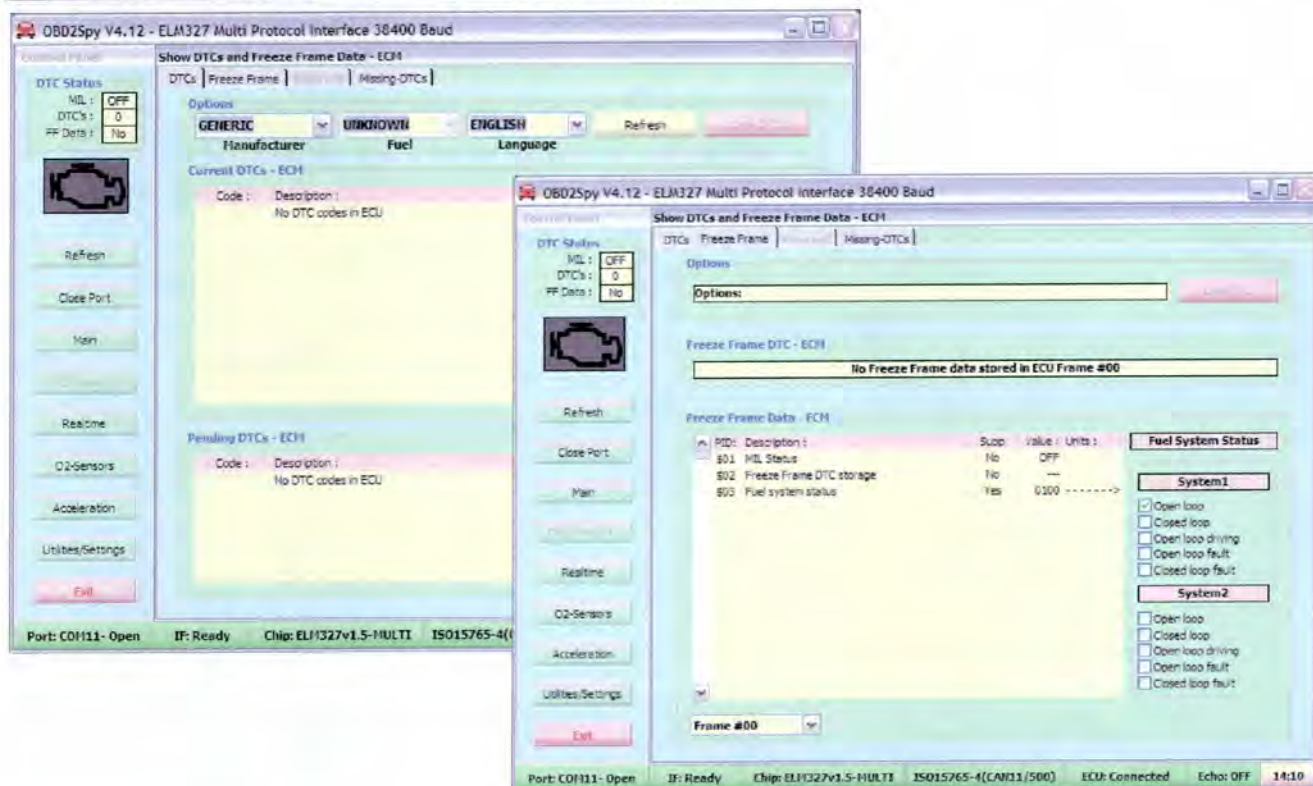


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Exhibit C.2. Interrogation of ECM [engine control computer] with OBD2Spy v4.12 and AutoEnginuity V11.0 scanners. The ECM evidenced no DTCs and no Freeze Frame data on either scanner.





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See Exhibit C.3. The SRS ECU [EDR] was interrogated with AutoEnginuity V11.0 scanner and a Bosch CDR v 8.10. No event data was saved in the EDR. DTCs B1801 [Driver Squib Stage 1 = open] and DTC B1811 [Driver Squib Stage 2 = open] were retrieved from the SRS ECU. These are entirely consistent with the unrestricted steering wheel which clearly ruptured the clockspring [used to connect to driver airbag squib 1 and squib 2].

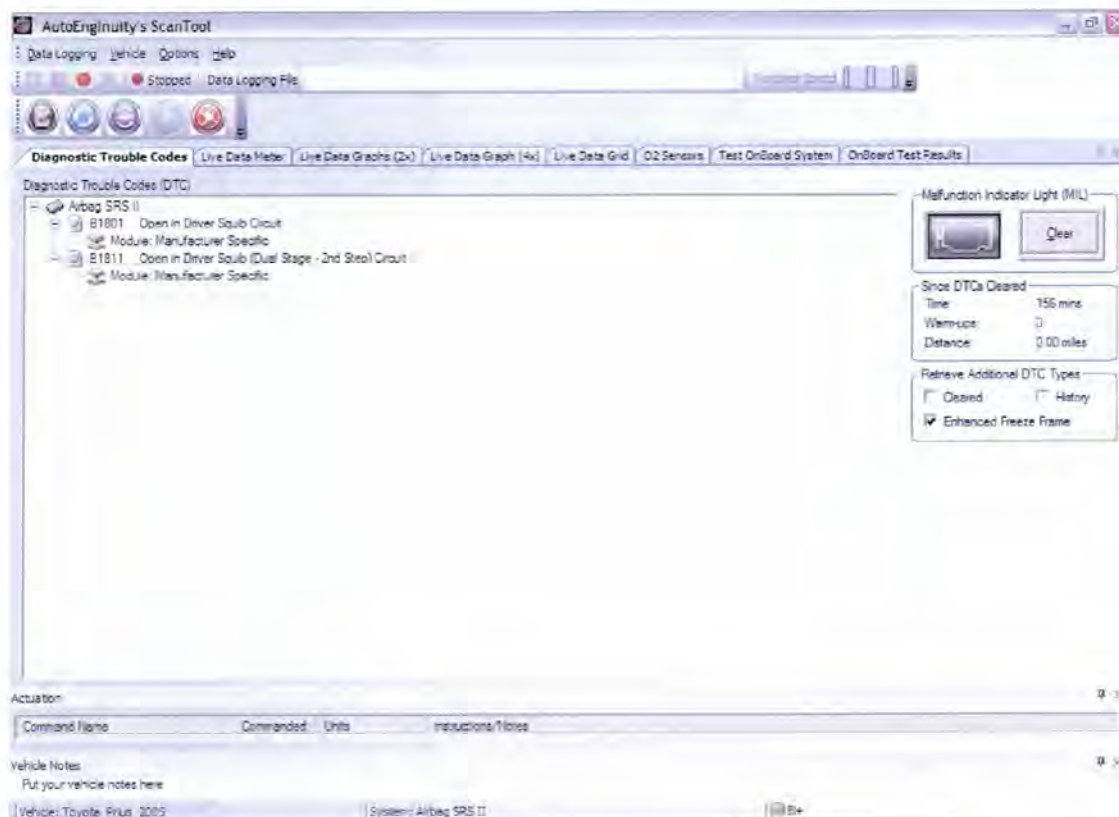


Exhibit C.4.1 Upper half of the steering column linkage. The steering column linkage in the subject 2005 Prius consists of two intermediate shafts and an electric power assist top column. Note annotated power assist output spline and upper intermediate shaft #2.

2005 Toyota Prius

Fig. 8: Identifying Steering Column Assy Components And Torque Specifications (1 Of 2)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

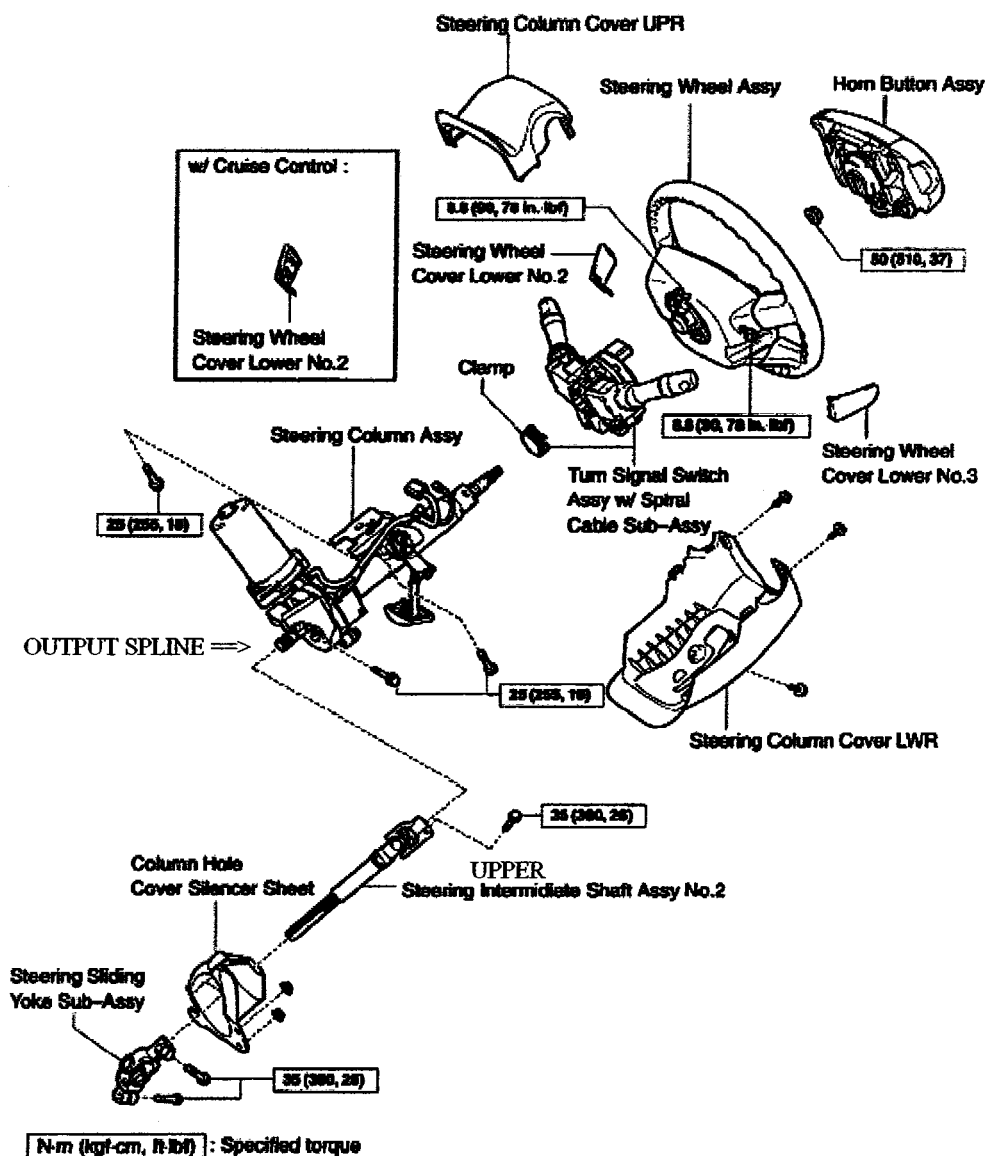
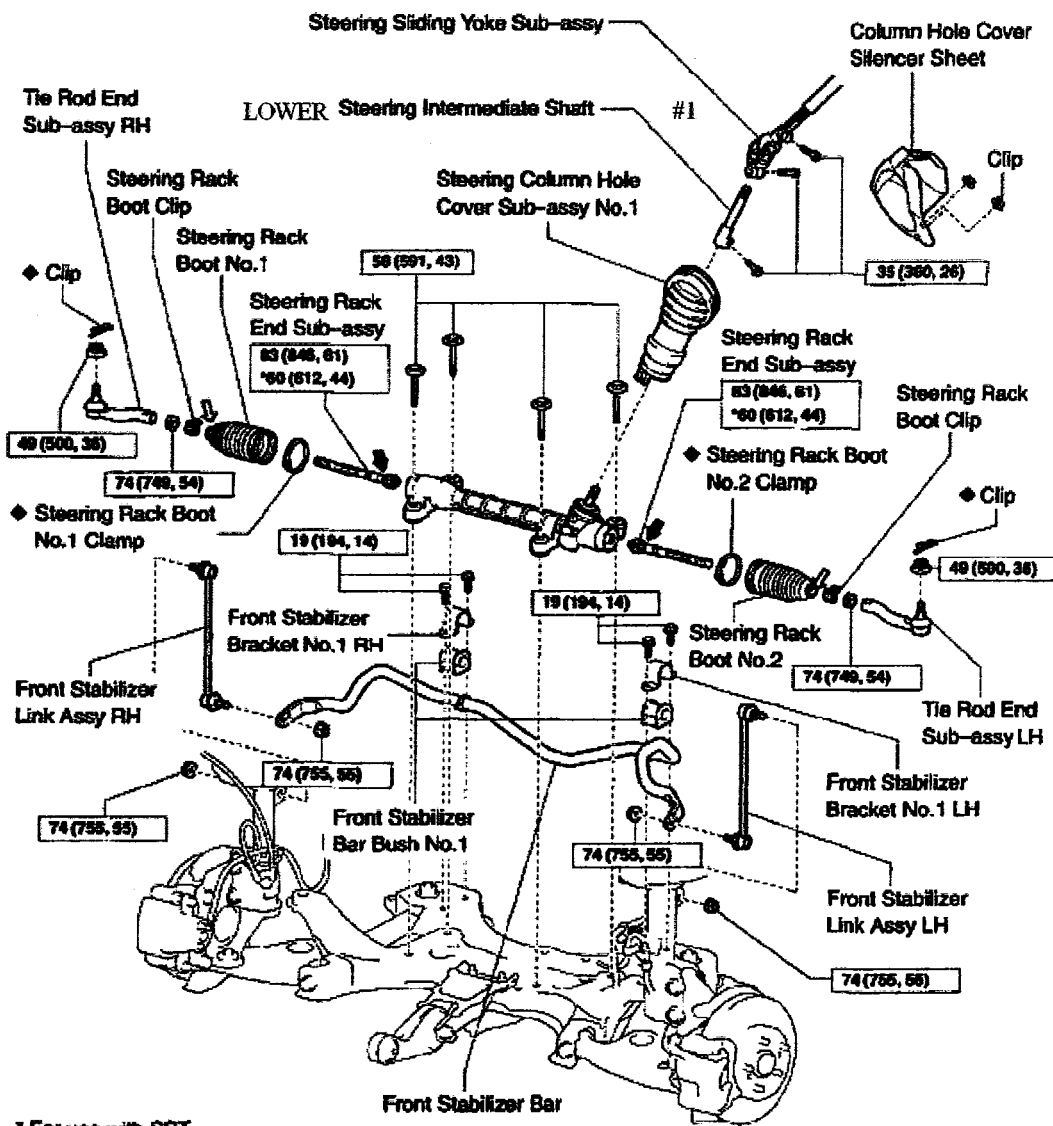


Exhibit C.4.2 Lower half of the steering column linkage. Note annotated lower intermediate shaft #1.

2005 Toyota Prius

Fig. 4: Identifying Steering Gear Assy Components And Torque Specifications
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.





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FORENSIC ANALYSIS OF ELECTRONIC AND COMPUTER VEHICLE CONTROLS

05Prius
Data & Analysis, Steering Failure

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Exhibit C.5.1 shows the [interim] customer notice for Recall 12V-537.

2004 to certain 2009 Model Year Prius Vehicles
COT - Steering Intermediate Extension Shaft (Phase 2) and
COU - Hybrid Electric Water Pump
SAFETY RECALL NOTICE (Interim Notice)

[VIN]

Dear Toyota Customer:

This notice is being sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act. Toyota has decided that two defects, which relates to motor vehicle safety, exist in some 2004 to certain 2009 Model Year Prius vehicles.

The purpose of this letter is to explain what the recalls are about and to keep you informed of Toyota's implementation plan. We are currently making preparations to implement the Safety Recall remedies. We will send you another notification when the preparations are complete.

What is the Steering Intermediate Extension Shaft condition?

The steering intermediate extension shaft ("extension shaft") is a component of the steering assembly and connects the steering column to the steering rack. Due to insufficient hardness of the extension shaft supplied by a specific supplier, the splines which connect the extension shaft to the steering gear box could deform if the steering wheel is frequently and forcefully turned to the full-lock position while driving at a slow speed, such as parking in a tight parking space. The splines could eventually wear out over time, which could result in loss of steering ability, increasing the risk of a crash.

What is the Hybrid Electric Water Pump condition?

There is a possibility that the coil wire of the electric motor installed in the Water Pump for the Hybrid System may have been scratched during the coiling manufacturing process at the supplier. In this condition, the coil wire may corrode at the scratched portion and in some cases break. If this occurs, the water pump could stop, leading to the illumination of various warning lights in the instrument panel. There is also the potential that a short circuit can occur between adjacent coil wires, resulting in an open fuse for the electric power supply circuit. If the fuse is open, the hybrid system will stop while the vehicle is being driven, which may increase the risk of a crash.

What should you do?

We appreciate your patience while we prepare the remedy parts. In the meantime, if you experience either condition described above, please contact your local Toyota dealer for diagnosis and appropriate repair. If the problem is related to the issues addressed by these recalls, the repair will be performed at **no charge** to you.

At this time the remedy for the Steering Intermediate Extension Shaft is available; however to minimize your inconvenience Toyota recommends that you wait until the Hybrid Electric Water Pump remedy is available and have both remedies performed at the same time. In the event you choose to have the Steering Intermediate Extension Shaft remedy performed prior to receiving the remedy notice, you will still need to return to the dealership to have the Hybrid Electric Water Pump replaced when the remedy is available.

If you would like to update your vehicle ownership or contact information, you may do so by registering at www.toyota.com/ownersupdate. You will need your full 17-digit Vehicle Identification Number (VIN) to input the new information.

What if you have other questions?

- Your local Toyota dealer will be more than happy to answer any of your questions and set up an appointment to perform the repair.
- You can find additional information and locate a Toyota dealer in your area by going online and visiting www.toyota.com/recall.
- Additional information is also available by contacting the Toyota Customer Experience Center at 1-888-270-9371 Monday through Friday, 5:00 am to 6:00 pm, or Saturday 7:00 am through 4:00 pm Pacific Time.

C07000 Images

Spanish translation on back side
Traducción en español en el reverso



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Exhibit C.5.2 shows an excerpt of the technician service instructions which depict the lower steering intermediate shaft [#1] in detail.

5. REMOVE THE EXTENSION SHAFT BOLT
NOTE: It may be necessary to turn the wheels to access the bolt.

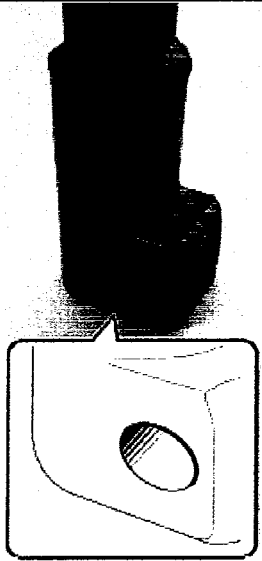
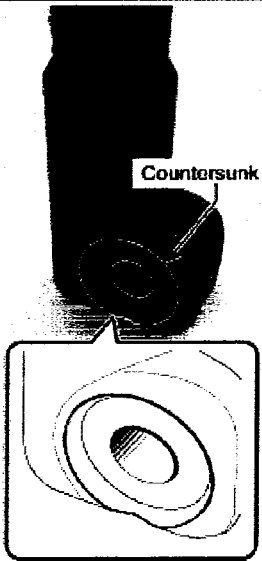
STOP DO NOT remove or disengage the extension shaft in any way.

6. INSPECT THE EXTENSION SHAFT

Front

Bolt seating face of extension shaft

All extension shafts have a noncountersunk bolt hole if seen from the opposite side.
Be sure to inspect from the side the bolt head seats to (no threads).

	NO Countersunk	Countersunk
Shaft Design		
Action Required	OK Replace the extension shaft bolt ONLY. Proceed to SECTION VII. EXTENSION SHAFT & BOLT REPLACEMENT. Complete STEPS 24-28 and 36-37.	NG Replace the extension shaft and 3 bolts. Proceed to SECTION VII. EXTENSION SHAFT & BOLT REPLACEMENT

NOTE: The new shaft in the kit (04001-41212) is manufactured with a countersink. DO NOT mix the old and new shaft.



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Exhibit C.6.1 Service record showing SV [lower] steering [intermediate #1] shaft Recall application apparently completed per R/O # 0048063.



Service History for Your 2005 PRIUS

VEHICLE 2005 PRIUS

VIN JTDKB20U953

CUSTOMER

JACKSONVILLE, FL

DATE	SERVICE TYPE	SERVICE PROVIDER	MILEAGE	DESCRIPTION
11/04/2010	Dealer	Rudy Luther Toyota	22,698	REPAIR ORDER NUMBER: 0590174 BODY ELEC-MAJOR, PRIUS FLOOR MATS, SYNTHETIC LOF, ADVISED OF SERVICE, RENTAL VEH CUST PAY, TIRE CONDITION-RED, WIPER/WASHER - RED, REPORT CARD COMPLETE, REPLACE BATTERY, PRIUS FLOOR MATS
02/19/2009	Dealer	Rudy Luther Toyota	20,866	REPAIR ORDER NUMBER: 0468703 BODY ELEC-MINOR
12/12/2006	Dealer	Frank Toyota	10,623	REPAIR ORDER NUMBER: 0048064 BRAKE INSPECTION
12/12/2006	Dealer	Frank Toyota	10,623	REPAIR ORDER NUMBER: 0048063 PRIUS STEERING SHAFT
04/18/2006	Dealer	Frank Toyota	8,271	REPAIR ORDER NUMBER: 0042047 S.O.PART RECEIVED, ELECTRICAL REPAIR



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Exhibit C.6.2 Current service record showing SV [lower] steering [intermediate #1] shaft
Recall application as not completed.

From: Crissy Daley <cdaley@frankmotors.com>
Subject: Service Repairs from Frank Toyota
Date: January 11, 2013 12:25:46 PM EST
To: [REDACTED]

Hello [REDACTED]

I am sorry to hear about your apartment getting broken in to. I tried to access your vehicle's service history in our records. Unfortunately since the last time you came in was back in 2006 we have purged all of our records. I was able to pull your Prius' National Service History from Toyota. I have attached that. I am sorry that we are not able to provide you with your service records but if there is anything else that I can do please let me know.

Crissy Bamick
Service Support Manager
Frank Toyota
(619) 474-5573 ext. 433
cdaley@frankmotors.com

VEHICLE

2005 TOYOTA PRIUS(1224)
JTOKB20U953 [REDACTED]

VEHICLE DETAILS

Original Selling Dealer: KEA FRY, NESA
TOYOTA 415731
DOFU: 11/15/2004 Model Description: PRIUS HYBRID GAS/ELEC SDN
Built Date: 10/21/2004 Exterior color: MILLENNIUM SILVER (01C0) Mobile App Capable: N
Transmission type: CVT-E Interior color: DARK CHARCOAL (FA18) Telematics Enabled: N
Engine type: 1NZ Edition: 4-DR GAS/ELEC

OWNER NOTIFICATION PROGRAMS

Campaign	Status	Date Sent	Sending Dealer
60G-2004 Through Early 2008 Model Year Prius Steering Intermediate Shaft Replacement	Completed	12/12/06	FRANK TOYOTA
90L-Safety Recall 90L - Potential Floor Mat Interference with Accelerator Pedal	Completed	11/04/10	RUDY LUTHER TOYOTA
50P-2004 Through Early 2005 Model Year Prius Electronic Control Module Reprogramming	Completed	04/06/06	FRANK TOYOTA
60B-Supplemental Restraint System (SR6) Airbag Replacement	Not applicable for VIN		
A0N-Limited Service Campaign (LSC) A0N - 2004 through Certain 2007 Model Year Prius Vehicles - Electric Hybrid Water Pump Replacement	Not Completed	---	---
C2T-Safety Recall C0T (C2T - Phase 2) Interim Notice - Steering Intermediate Extension Shaft	Not Completed	---	---
C1U-Safety Recall C0U (C1U) Interim Notice - Hybrid Electric Water Pump	Not Completed	---	---

TOYOTA ROADSIDE ASSISTANCE



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Exhibit C.8. Showing the upper steering intermediate shaft [#2] as found separated from the exit spline of the power assist column output. This separation had no observable or known intervening cause such as a collision or abusive usage.

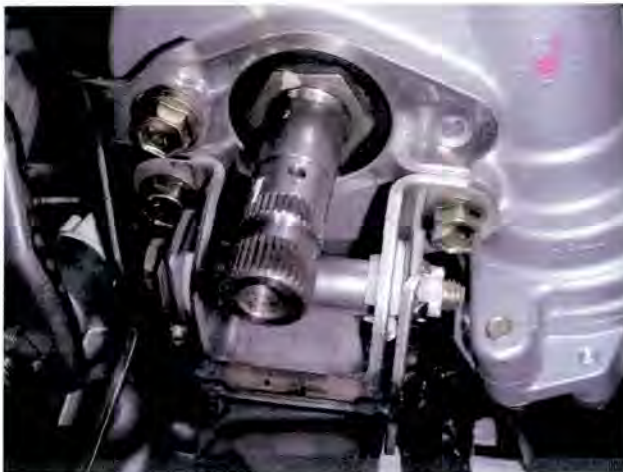


Exhibit C.9 shows the upper mating end of the upper end of the upper steering intermediate shaft #2 and the fact that its internal splines are mechanically worn away for approximately 1/4 of the intended mating distance [with the power assist exit spline]. It should be noted that the upper intermediate shaft #2 is actually part of a sliding link, and the malfunction portion was intended by design to have been locked onto the power assist exit spline. Note metallurgical debris inside spline cavity.





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Exhibit 12 A photo sequence showing that exemplar vehicle and its upper intermediate steering shaft #2 assembly on the exemplar power assist exit spline annulus. These photos clearly show, with no ambiguity, that a proper installation includes the cinching bolt properly residing in the power assist exit spline annulus.



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Ms. Nancy Lummen Lewis
Associate Administrator for Enforcement
National Highway Traffic Safety Administration
Attn: Recall Management Division (NVS-215)
1200 New Jersey Ave, SE
Washington, D.C. 20590

W48-226