



October 7, 2010

VIA FEDERAL EXPRESS

Jeff Quandt, Chief
Vehicle Integrity Division
Office of Defects Investigation
U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue, S.E.
Washington D.C. 20590

Re: **Preliminary Evaluation (PE10-030)**
Loss of Steering Capability; 2010 MY Kia Soul

Dear Mr. Quandt:

This letter is submitted in response to your letter dated August 18, 2010 sent to Hyundai America Technical Center, Inc. ("HATCI") (Reference NVS-213kmb/PE10-130) with regard to the 2010 and 2011 Kia Soul. That letter requested information "to investigate the potential for the steering shaft to decouple from the hand wheel resulting in complete loss of steering capability in certain model year (MY) 2010 and 2011 Kia Soul vehicles". We note that your letter erroneously stated that the Kia Soul was manufactured by Hyundai America Technical Center Inc. ("HATCI"). Although HATCI is an organization which has been designated by Kia Motors Corp. ("KMC") and Kia Motors America, Inc. ("KMA") to act as their communication liaison with the National Highway Traffic Safety Administration ("NHTSA"), HATCI itself does not manufacture any vehicles and in particular did not manufacture the 2010 or 2011 Kia Soul. This response is submitted to NHTSA by HATCI in its limited role as a communication liaison.

REQUEST NO. 1:

State, by model and model year, the number of subject of vehicles Kia has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by Kia, state the following:

- a. Vehicle Identification number (VIN);
- b. Make;
- c. Model;
- d. Model Year;
- e. Date of manufacture;
- f. Date warranty coverage commenced; and
- g. The State in the United States where the vehicle was originally sold or leased (or

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delivered for sale or lease).

Provide the table in Microsoft Access 2000, or a compatible format, entitled "PRODUCTION DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

RESPONSE TO REQUEST NO. 1:

The total number of 2010 MY Soul vehicles manufactured for sale in the United States is 74,522. The total number of 2011 MY Soul vehicles manufactured for sale in the United States through September 17, 2010 is 27,463.

A listing of all 2010 and 2011 Kia Soul vehicles is provided on a Data Collection Disc under the category "PRODUCTION DATA" and submitted contemporaneously with this response.

REQUEST NO. 2:

State the number of each of the following, received by Kia, or of which Kia is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:

- a. Consumer complaints, including those from fleet operators;
- b. Field reports, including dealer field reports;
- c. Reports involving a crash, injury, or fatality, based on claims against the manufacturer involving a death or injury, notices received by the manufacturer alleging or proving that a death or injury was caused by a possible defect in a subject vehicle, property damage claims, consumer complaints, or field reports;
- d. Property damage claims;
- e. Third-party arbitration proceedings where Kia is or was a party to the arbitration; and
- f. Lawsuits, both pending and closed, in which Kia is or was a defendant or codefendant.

For subparts "a" through "d," state the total number of each item (e.g., consumer complaints, field reports, ect.) separately. Multiple incidents involving the same vehicle are to be counted separately. Multiple reports of the same incident are also to be counted separately (i.e., a consumer complaint and field report involving the same incident in which a crash occurred are to be counted as a crash report, a field and a consumer complaint).

In addition, for items "c" through "f," provide a summary description of the alleged problem and causal and contributing factors, and Kia's assessment of the problem with a summary of the significant underlying facts and evidence. For items "e" and "f," identify the parties to the action, as well as the caption, court, docket number, and date on which the complaint or other document initiating the action was filed.

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RESPONSE TO REQUEST NO. 2:

- a. Consumer Communications—1
- b. Field Reports—0
- Technical Assistance Reports—0
- c. Reports involving crash, injury or fatality alleging death or injury was caused by possible defect—0
- d. Property Damage Claims—0
- e. Third Party Arbitrations—0
- f. Lawsuits—0

Kia's search included all files through September 17, 2010 which included the word "steer". The results were then reviewed to identify those items which related, or may relate to the alleged defect as described in your letter.

REQUEST NO. 3:

Separately, for each item (complaint, report, claim, notice, or matter) within the scope of your response to Request No. 2, state the following information:

- a. Kia's file number or other identifier used;
- b. The category of the item, as identified in Request No. 2 (i.e., consumer complaint field report ect.);
- c. Vehicle owner or fleet name (and fleet contact person), address, and telephone number;
- d. Vehicle's VIN;
- e. Vehicle's make, model and model year;
- f. Vehicle's mileage at time of incident;
- g. Incident date;
- h. Report or claim date ;
- i. Whether a crash is alleged;
- j. Whether property damage is alleged;
- k. Number of alleged injuries, if any; and
- l. Number of alleged fatalities, if any.

Provide this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER TWO DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

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RESPONSE TO REQUEST NO. 3:

A listing of all responsive communications is provided on a Data Collection Disc under the category "REQUEST NUMBER TWO DATA".

REQUEST NO. 4:

Produce copies of all documents related to each item within the scope of Request No. 2. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method Kia used for organizing the documents.

RESPONSE TO REQUEST NO. 4:

Copies of the documents identified in response to Request No. 2 are submitted with this letter. They are organized by the following categories:

- Consumer Affairs Department files from KMA's department database (1)

See Tab 1.

REQUEST NO. 5:

State, by model and model year, a total count for all of the following categories of claims, collectively, that have been paid by Kia to date relate to, or may relate to, the alleged defect in the subject vehicles: warranty claims; extended warranty claims; claims for good will services that were provided; field, zone, or similar adjustments and reimbursements; and warranty claims or repairs made in accordance with a procedure specified in a technical service bulletin or customer satisfaction campaign.

Separately, for each such claim, state the following information:

- a. Kia's claim number;
- b. Vehicle owner or fleet name (and fleet contact person) and telephone number;
- c. VIN;
- d. Repair date;
- e. Vehicle mileage at time of repair;
- f. Repairing dealer's or facility name, telephone number, city and state or ZIP code;
- g. Labor operation number;
- h. Problem code;
- i. Replacement part number(s) and description(s);
- j. Concern stated by customer; and

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- k. Comment, if any, by dealer/technician relating to claim and/or repair.

Provide the detailed information in Microsoft Access 2000, or a compatible format, entitled "WARRANTY DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

RESPONSE TO REQUEST NO. 5:

A total of one (1) warranty claim has been received which relates to the alleged defect. A listing of the responsive warranty claims through September 17, 2010 is provided on a Data Collection Disc under the category "WARRANTY DATA".

REQUEST NO. 6:

Describe in detail the search criteria used by Kia to identify the claims identified in response to Request No. 5, including the labor operations, problem codes, part numbers and any other pertinent parameters used. Provide a list of all labor operations, labor operation descriptions, problem codes, and problem code descriptions applicable to the alleged defect in the subject vehicles. State, by make and model year, the terms of the new vehicle warranty coverage offered by Kia on the subject vehicles (i.e., the number of months and mileage for which coverage is provided and the vehicle systems that are covered). Describe any extended warranty coverage option(s) that Kia offered for the subject vehicles and state by option, model, and model year, the number of vehicles that are covered under each such extended warranty.

RESPONSE TO REQUEST NO. 6:

Kia searched for all repair/replacement warranty claim data for the Upper Column Assembly (Part No. 56310 2K100) and the Universal Joint Assembly (Part No. 56400 2K100) applicable to the alleged defect received through September 17, 2010.

Codes Used. In your letter, you requested that Kia provide its "problem code" information. Kia refers to the "problem code" as the "cause code", which carries the letter "C" which reflects the technician's evaluation of the cause of the problem. You also requested that Kia provide information regarding "concerns stated by the customer". Kia's code chart refers to these as "condition codes," but they are commonly referred to as "nature codes," and carry the "N" designation. These reflect the service writer's or technician's understanding of the customer's information.

A copy of KMA's coding sheet for warranty claims is submitted with this response. **See Tab 2.**

The 2010 and 2011 MY Soul vehicles have a 5 year, 60,000 mile basic warranty. No extended or additional warranties were provided to Kia customers.

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REQUEST NO. 7:

Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles, that Kia has issued to any dealers, regional or zone offices, field offices, fleet purchasers, or other entities. This includes, but is not limited to, bulletins advisories, informational documents, training documents, or other documents or communications, with the exception of standard shop manuals. Also include the latest draft copy of any communication that Kia is planning to issue within the next 120 days.

RESPONSE TO REQUEST NO. 7:

Copies of the following documents are attached:

- Letter to Kia Dealer Principals, dated August 16, 2010;
- 2010 Soul Steering Inspection Request (Customer Inspection Program), dated 8/19/10
- Soul (AM) Steering Shaft Inspection
- Technical Service Bulletin titled "Service Action: Steering Shaft Inspection Procedure", No. 029, dated September 2010.
See Tab 3.
- Email communications. **See Tab 4.**

REQUEST NO. 8:

Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for Kia. For each such action, provide the following information:

- a. Action title or identifier;
- b. The actual or planned start date;
- c. The actual or expected end date;
- d. Brief summary of the subject and objective of the action;
- e. Engineering group(s)/supplier(s) responsible for designing and for conducting the action;
and
- f. A brief summary of the findings and/or conclusions resulting from the action.

For each action identified, provide copies of all documents related to the action, regardless of whether the documents are interim, draft, or final form. Organize the documents chronologically by action.

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RESPONSE TO REQUEST NO. 8:

Below is a summary of the "actions" taken by Kia or on Kia's behalf that may relate to the alleged defect in the subject vehicles:

Action Title	Start Date	End Date	Subject/Object of Action	Group Responsible	Finding/Conclusion Summary
N.America Soul Universal Joint Decoupling Investigation Report, dated 8/16/10	8/13/10	8/16/10	Investigate potential cause for universal joint decoupling in the Hamilton vehicle as reported to NHTSA	KMC Quality Assurance Team 1	<ul style="list-style-type: none"> U-joint may not have been fully inserted into the upper column shaft despite tightening of the pinch bolt. However, actual cause unclear based on an evaluation of Mando's assembly process, which indicates this would not be possible in the Mando assembly process. <p>See Tab 5.</p>
Same Document As Above	8/13/10	8/16/10	Inspect universal joint and column shaft assembled parts at Mando plant.	KMC Quality Assurance Team 1	<p>All available 400 parts inspected and found to be properly assembled.</p> <p>See Tab 5.</p>
Same Document As Above	8/13/10	8/16/10	<ul style="list-style-type: none"> Inspect Soul vehicles at Kia plant ready for shipment. Inspect Soul vehicles at Mokpo port. 	KMC Quality Assurance Team 1	<p>All available 571 vehicles inspected at Kia assembly plant and found to be properly assembled.</p> <ul style="list-style-type: none"> All available 1,338 vehicles inspected at Mokpo port and found to be properly assembled. <p>See Tab 5.</p>
Customer Inquiry Response	8/16/10	N/A	Offer a free inspection to customers inquiring regarding NHTSA	KMA Consumer Affairs	<p>As of 10/04/10, total of 324 Kia Soul vehicles were inspected and none</p>

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Program			investigation and their 2010 Soul.	Department	exhibited any decoupling or potential for decoupling.
KMA Inspection of U.S. Ports	8/18/10	9/8/10	Inspect Soul vehicles at U.S. ports.	KMA Service Department	<ul style="list-style-type: none"> • A total of 604 vehicles were inspected. • None of the inspected vehicles were improperly assembled or exhibit any decoupling or potential decoupling.
Customer Inspection Program	8/19/10	9/23/10	Contact by phone or otherwise all owners of Soul vehicles manufactured same date as Incident VOQ vehicle	KMA Consumer Affairs Department	<ul style="list-style-type: none"> • A total of 466 2010MY Kia Soul vehicles manufactured on 3/29/10. • As of 10/04/10, 98 vehicles have been inspected. For non-responding customers, their vehicles will all be inspected as they are serviced. • None of the inspected vehicles were improperly assembled or exhibit any decoupling or potential decoupling. See Tabs 3 & 4.
N.America Universal Joint Decoupling Investigation Report, dated 8/19/10	8/16/10	8/19/10	Inspection of all records reflecting inspections of steering shaft components at Mobis module plant and Kia assembly plant as well as driving inspections of steering components	KMC Quality Assurance Team 1	<ul style="list-style-type: none"> • No quality issues for modules assembled in March 2010 at Mobis plant through final vehicle inspections • NOTE: Entire repair history reviewed. During early production of Kia Soul (02/09), 3 vehicles had

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					<p>repairs due to over torquing at KMC when attaching bottom of Mando steering shaft to steering rack. No other repair history for any vehicles.</p> <ul style="list-style-type: none">• KMC assign Mobis new inspection requirement for Mando assemblies. KMC adds new steering column inspection procedure at KMC. <p>See Tab 6.</p>
Soul Column & U/Joint Fatigue Durability Test, dated 9/14/10	8/26/10	9/13/10	Improperly assemble 3 U-Joints off of the assembly line to avoid foolproofing devices and subject to components to standard twisting durability testing	Mando Steering 1 Test Assessment Team	<ul style="list-style-type: none">• Normal result is 1,000,000 cycles with no problem. Shafts separated at 102, 129 and 480 cycles, respectively. Roughly equivalent to 500 to 1800 miles driving. <p>See Tab 7.</p>
Service Action: Steering Shaft Inspection Procedure (SA057)	9/23/10	N/A	Inspect steering shaft universal joint on 2010 Kia Soul models built from 3/29/10 to 4/5/10 to determine if potential for decoupling exists.	KMA Service Department	<ul style="list-style-type: none">• As of 10/4/10, a total of 45 vehicles of 1,747 have been inspected.• None of the inspected vehicles were improperly assembled or exhibit any decoupling or potential decoupling.
Soul Steering Column Separation—Metallurgical Evaluation, dated 10/01/10	N/A	N/A	Evaluation of subject incident part and various exemplar parts including improperly assembled durability test parts for markings	Fowler, Inc	<ul style="list-style-type: none">• Marks and deformation on incident part not produced at time of manufacture or assembly.• Eliminate possibility of

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			and deformation marks. ¹		pinch bolt failure or wearing out • Deformation to splines occurs during separation of upper and lower shafts • Deformation during normal disassembly is very light • Deformation of incident part is comparable with durability part separations after improper assembly at low testing cycles • Strong probability that the steering shaft was disassembled and reassembled after leaving Mando's control . See Tab 8.
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REQUEST NO. 9:

Describe in detail the design, material composition, manufacture, quality control, supply, and installation of the subject components, including:

- a. All assembly processes related to the subject components, including graphic depictions (i.e., photographs and/or video footage) detailing each step in the vehicle assembly process related to the subject components;
- b. All "poka-yoke" features that help technicians avoid assembly mistakes (i.e., mechanisms to ensure that parts are assembled in the proper sequence and orientation, fasteners can only be inserted when there is adequate part engagement, etc.);
- c. Whether any thread dressing compound(s), such as a lubricant or thread locking agent, is used on any subject components fasteners;
- d. The target, maximum and minimum design torque specifications for subject component fasteners, both static and dynamic;

¹ Parts C and D identified in this report are the Mando durability tested Parts #2 and #3, respectively.

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- e. The type(s) of tooling used to apply torque to subject component fasteners (i.e., DC electric or pneumatic power tools);
- f. Whether dynamic torque and/or angular displacement applied to subject component fasteners is monitored and/or recorded for each subject vehicle;
- g. The process for operations not completed in station on the assembly line, including whether there is an Automatic Line Stop procedure if the torque applied to a subject component fastener is not achieved at the respective assembly line station; and
- h. The frequency of static (audit) torque checks on subject component fasteners (every vehicle, samples or none).

RESPONSE TO REQUEST NO. 9:

- a. Attached is a video which details the assembly process for the subject component. **See Tab 9.**
- b. Kia does not use the term “poka-yoke”, which it understands to be a phonetic representation of a Japanese term, and has understands this request to mean “foolproofing” and/or “failsafing” features that prevent assembly errors. Attached is a video which details the foolproofing features for assembly Station Five where the upper and lower steering shafts are connected. **See Tab 9.** The key elements of this foolproofing just for Station Five are as follows:
 - (i) The upper shaft must be properly positioned so that sensors identify that the upper shaft is correctly placed in its cradle and aligned;
 - (ii) The proper positioning of the upper shaft is confirmed when the locking clamp moves into place from the right and above the upper shaft and it must connect to the locking clamp détente in order for the assembly process to continue;
 - (iii) The lower shaft must be properly inserted into the upper shaft and positioned in the lower jig in order for an electronic signal to be sent which turns on the air torque wrench and permits the primary assembly tightening of the pinch bolt;
 - (iv) The pinch bolt must be manually tightened an additional 2 times in order to reach the correct torque level which then sends a further electronic signal which releases the locking clamp and allows the now completed steering shaft assembly to be removed from the Station Five jigs; and
 - (v) If a forced mis-assembly occurred, the 2 manual tightening turns would not be sufficient to reach an adequate torque level and instead at least 7 tightening turns would be required.
- c. No.
- d. Kia’s design torque specification for the subject component fasteners is 1.8 Kgf/m to 2.5 Kgf/m. The torque applied to the subject components is electronically set at 2.2Kgf/m.

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- e. Pneumatic power tool; i.e., an air driven torque wrench which also requires the application of additional manual force to reach the required torque level. The tool is connected electronically to the system and the correct torque must be read by the tool in order to electronically release the clamp locking the steering shaft assembly from the upper jig. See **Tab 9 for attached torque video.**
- f. Yes. The use of electronic sensors requires that both the upper and lower shafts be properly positioned in their respective jigs, which includes the assurance of their angular relationship, in order for the assembly process to continue at various points. In addition, the torque must be properly applied in order to the assembly to be released from the locking clamp. The torque applied to the subject component fasteners is electronically set at 2.2 kgf/m. The result of this process is recorded by the assembly worker applying colored torque marks to the pinch bolt and other tightened fasteners, and manually recorded in the final inspection sheet. The electronic torque readings are not recorded.
- g. If any one of a number of key steps is not properly carried out or completed, including if the proper amount of torque is not reached, the assembly technician is unable to move on to the next step in the assembly process and ultimately the steering shaft assembly cannot be removed from the Station Five jig and move to the next step in the assembly process. The technician is advised when the proper torque is reached by an audible beep, plus the release of the locking clamp. See attached video. **Tab 9.**
- h. There is 100% electronic checking of the cinch bolt torque. The assembly technician confirms his action in properly checking the torque by marking the pinch bolt with a colored marker. The Quality Control department independently performs a torque tightening check on three pieces each week. The torqueing machinery is checked for foolproofing accuracy each day by the assembly department and monthly by the Quality Control department. See **Tab 10.**

REQUEST NO. 10:

Describe all modifications or changes made by, or on behalf of, Kia in the design, material composition, manufacture, quality control, supply, or installation of the subject component, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:

- a. The date or approximate date on which the modification or change was incorporated into vehicle production;
- b. A detailed description of the modification or change;
- c. The reason(s) for the modification or change;
- d. The part number(s) (service and engineering) of the original component;
- e. The part number(s) (service and engineering) of the modified component;

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- f. Whether the original unmodified component was withdrawn from production and/or sale, and if so, when;
- g. When the modified component was made available as a service component; and
- h. Whether the modified component can be interchanged with earlier production components.

Also, provide the above information for any modification or change that Kia is aware of which may be incorporated into vehicle production within the next 120 days.

RESPONSE TO REQUEST NO. 10:

There have been no modifications or changes to the Upper Column Assembly (Part No. 56310 2K100) and the Universal Joint Assembly (Part No. 56400 2K100) that relate to the alleged defect.

Following its receipt of the report of the incident which prompted the current investigation, Kia's steering column supplier, Mando, reviewed its entire assembly process and determined there was no realistic way that a mis-assembly could have occurred, especially since the assembly operation was being conducted by a skilled worker with 17 years experience on the assembly process. However, Mando determined that if the lower shaft was properly positioned and the lower jig sensors recognized this and turned on the air wrench, but then the worker inexplicably pulled the lower shaft out of the upper shaft and lined it up exactly outside the pinch bolt hole, and the worker ignored the obvious lower shaft sticking out of the upper shaft, and if he also ignored that the number of manual torque force applications would increase from 2 final tightening turns to at least 7 final tightening turns to get a torque sensor reading to release the locking clamp, then it would be theoretically improper assembly to occur. Mando therefore added a guide pin on August 20, 2010 to prevent the lower shaft from being pulled out of the upper shaft once sensing occurred until proper torque was reached.

An additional protective measure, KMC assigned Mobis a new inspection requirement on steering column assemblies. KMC further added a new inspection procedure at KMC for dashboard assemblies. **See Tab 6.**

REQUEST NO. 11:

Produce one of each of the following:

- a. Exemplar samples of each design version of the subject components;
- b. Field return samples of the subject components exhibiting the subject failure mode; and
- c. Any kits that have been released, or developed, by Kia for use in service repairs to the subject components/assembly which relate, or may relate, to the alleged defect in the subject vehicles.

RESPONSE TO REQUEST NO. 11:

- a. An exemplar steering shaft was previously provided on September 1, 2010.

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- b. There are no field return samples which exhibit the subject failure mode. The only field sample in Kia's possession belongs to the Hamilton vehicle identified in VOQ #10346872, which was shown to NHTSA representatives on September 1, 2010.
- c. None.

REQUEST NO. 12:

State the number of each of the following that Kia has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), model and model year of the vehicle in which it is used and month/year of sale (*including the cut-off date for sales, if applicable*):

- a. Subject components; and
- b. Any kits that have been released, or developed, by Kia for use in service repairs to the subject component/assembly.

For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number). Also identify by make, model and model year, any other vehicles of which Kia is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

RESPONSE TO REQUEST NO. 12:

In response to 12(a), a chart identifying part sales is attached. **See Tab 11.** As for 12(b), none.

The supplier of the Upper Column Assembly (Part No. 56310 2K100) and the Universal Joint Assembly (Part No. 56400 2K100) is Mando located at 5-22, Bangye-Ri, Munmak-Eub, Wonju-City, Gangwon-Do, Korea 220-805. The point of contact is Moon Sik Lee, Senior Manager, Quality Control Team, Steering Division. Mr. Lee can be reached at (82) 33-730-6660.

REQUEST NO. 13:

Furnish Kia's assessment of the alleged defect in the subject vehicle, including:

- a. The casual or contributory factor(s);
- b. The failure mechanism(s);
- c. The failure mode(s);
- d. The risk to motor vehicle safety that it poses;
- e. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning; and
- f. The report included with this inquiry. Provide the assembly line station torque and/or static (audit) torque applied to the subject component fasteners in the complaint vehicle. Also, provide

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the complete repair history on the complaint vehicle to date, including all repair work performed prior to entering service (i.e., at the assembly plant prior to final assembly, at the port prior to deliver to the selling dealer, etc.).

RESPONSE TO REQUEST NO. 13:

- a. **Causal or contributory factor(s):** None. Mando's assembly process and fool-proofing made it impossible from a practical standpoint to improperly assemble the upper column and universal joint assembly, especially when the assembly process was being conducted by a skilled worker with 17 years experience on this type of machinery.
- b. **Failure mechanism(s):** None.
- c. **Failure mode(s):** None.
- d. **The risk to motor vehicle safety that it poses:** None. The skilled worker experience and capabilities combined with the extensive fool-proofing built in to the assembly machinery, along with the obvious visual and physical cues to warn the worker, made it impossible in a very real sense to improperly assemble the upper column and universal joint assembly.
- e. **What warnings, if any, the operator and other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning:** Not applicable, as stated. For completeness, the following is noted. If the worker properly inserted the lower shaft into the upper shaft while the lower shaft was properly positioned in the lower jig, and then the assembly worker pulled the lower shaft out of the upper shaft and positioned it so that the pinch bolt would just miss the end of the shaft, the following warnings would be received:
 - (i) The lower shaft would be visibly protruding from the upper shaft directly in the worker's line of vision;
 - (ii) The lower shaft would visibly be out of position in the lower jig and visible to the worker;
 - (iii) Once the air wrench had applied the initial pressure, the worker would find that he needed to apply 7 tightening turns instead of the normal 2 turns in order to register an adequate level of torque force on the pinch bolt and thus release the locking clamp; and
 - (iv) The improperly assembled shaft would be too long and would not sit properly in the storage rack into which the worker placed the assembly.
- f. **The report included with this inquiry:**

VOQ No. 10346872, 08/02/10 (VIN: KNDJT2A20A7166857), Christina Hamilton

"I purchased a 2010 Kia Soul and had it about two months when while driving the steering column came off. I took pictures. As I had no control over the wheels, I didn't realize it until my car wouldn't stop. I kept pushing down on the brakes and there was something in the way, that is when I realized it was the steering column. . . ."

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The station torque applied to the 2010 Soul is 2.2kgf/m, as controlled by electronic sensors. See response to 9(f) above. The Kia warranty system shows no repairs to the complaint vehicle before the incident. See Tab 12. No repair work was performed prior to the vehicle entering service (i.e., at the Mobis module assembly plant, at the KMC vehicle assembly plant, at the ports, or by the selling dealer).

This is a unique incident in which a properly assembled steering shaft assembly was disassembled at the upper universal joint and then improperly re-assembled. Due to the obviousness of the incorrect assembly to a trained technician, Kia believes that the person doing the re-assembly had limited experience with the proper way to assemble a steering shaft universal joint, including the proper way to fully insert the spline shaft. This is supported by all of the investigations undertaken in response to this PE, including inspections of large numbers of vehicles and components, repeated detailed analyses and videotaping of the Mando assembly process, and a broad metallurgical analysis of the incident components and a range of exemplars including improperly assembled durability tested parts. It is clear that the type of disassembly present in this case would have lasted less than 2000 miles of driving. Since the incident vehicle had been driven 4,313 miles at the time of the incident, Mando believes the disassembly and reassembly would have occurred since the incident vehicle reached the 2,500 mileage point, and most likely in the 100 to 500 miles prior to the incident occurring. The exact timing is likely to be directly related to how much torque was applied to the pinch bolt at the time of reassembly.

Sincerely,



Robert Babcock

Senior Manager, Regulation and Certification Department