



**INFORMATION Redacted PURSUANT TO THE FREEDOM OF INFORMATION ACT (FOIA), 5 U.S.C. 552(B)(6)**

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OFFICE OF DEFECTS & INVESTIGATIONS  
2011 MAR 30 A 10:10

March 25, 2011

Mr. Frank S. Borris, Director  
Office of Defects Investigation  
National Highway Traffic Safety Administration  
1200 New Jersey Avenue SE, Room W45-302  
Washington, DC 20590

Dear Mr. Borris:

Subject: PE11-003:NVS-213kmb

The Ford Motor Company (Ford) response to the agency's February 8, 2011, letter concerning reports of alleged wheel stud fracture in 2009 through 2011 Ford Fusion, Lincoln MKZ, and Mercury Milan vehicles is attached.

The agency's alleged defect is extremely broad and encompasses not only fractured wheel studs and wheel separations but also includes wheel studs and lug nuts that are stripped, seized or loose, and/or fracture during wheel service. While Ford is providing all reports and claims that are responsive or are potentially responsive to this broad request, Ford's comments focus on those reports and warranty claims that allege either a fractured wheel stud or wheel separation.

The reports and claims provided in this response indicate that operators visually observe broken wheel studs or report hearing noises, or experiencing vibration, prompting them to bring the vehicle in for service, after which a broken wheel stud was identified as the cause of the noise or vibration. The majority of reports alleging a fractured wheel stud indicate that only one wheel stud is fractured. Ford design practice requires validation of proper wheel joint function with one missing lug nut and all other lug nuts at the minimum torque specification. Based on the available data, Ford believes that significant noise and/or vibration is present prior to any risk of a wheel separation, and that it is highly unlikely that a vehicle would fracture all five wheel studs simultaneously. This is supported by the number of reports of broken wheel studs without wheel separation. Ford is continuing to assess the data and reports associated with this subject and will keep the agency informed of our findings.

If you have any questions concerning this response, please feel free to contact me.

Sincerely,

James P. Vondale

Attachment



FORD MOTOR COMPANY (FORD) RESPONSE TO PE11-003

Ford's response to this Preliminary Evaluation information request was prepared pursuant to a diligent search for the information requested. While we have employed our best efforts to provide responsive information, the breadth of the agency's request and the requirement that information be provided on an expedited basis make this a difficult task. We nevertheless have made substantial effort to provide thorough and accurate information, and we would be pleased to meet with agency personnel to discuss any aspect of this Preliminary Evaluation.

The scope of Ford's investigation conducted to locate responsive information, focused on Ford employees most likely to be knowledgeable about the subject matter of this inquiry and on review of Ford files in which responsive information ordinarily would be expected to be found and to which Ford ordinarily would refer. Ford notes that although electronic information was included within the scope of its search, Ford has not attempted to retrieve from computer storage electronic files that were overwritten or deleted. As the agency is aware, such files generally are unavailable to the computer user even if they still exist and are retrievable only through expert means. To the extent that the agency's definition of Ford includes suppliers, contractors, and affiliated enterprises for which Ford does not exercise day-to-day operational control, we note that information belonging to such entities ordinarily is not in Ford's possession, custody or control.

Ford has construed this request as pertaining to vehicles manufactured for sale in the United States, its protectorates, and territories.

Ford notes that some of the information being produced pursuant to this inquiry may contain personal information such as customer names, addresses, telephone numbers, and complete Vehicle Identification Numbers (VINs). Ford is producing such personal information in an unredacted form to facilitate the agency's investigation with the understanding that the agency will not make such personal information available to the public under FOIA Exemption 6, 5 U.S.C. 552(b)(6).

Answers to your specific questions are set forth below. As requested, after each numeric designation, we have set forth verbatim the request for information, followed by our response. Unless otherwise stated, Ford has undertaken to provide responsive documents dated up to and including February 8, 2011, the date of your inquiry. Ford has searched within the following offices for responsive documents: Sustainability, Environment and Safety Engineering, Ford Customer Service Division, Purchasing, Quality, Research, Global Core Engineering, Vehicle Operations, and North American Product Development.

Request 1

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

- a. Vehicle identification number (VIN);
- b. Make;
- c. Model;
- d. Model Year;
- e. Wheel type;
- f. Date of manufacture;
- g. Date warranty coverage commenced; and

- h. The State in the United States where the vehicle was originally sold or leased (or delivered for sale or lease).

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

Answer

Ford records indicate that the approximate total number of subject vehicles sold in the United States, (the 50 states and the District of Columbia) protectorates, and territories (American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and Virgin Islands) is 591,662.

The number of subject vehicles sold in the United States by model and model year is shown below:

Model	2009 MY	2010 MY	2011 MY	Total
Ford Fusion	103,099	278,477	93,717	475,293
Lincoln MKZ	16,665	27,464	8,569	52,698
Mercury Milan	18,551	38,838	6,282	63,671

The requested data for each subject vehicle is provided in Appendix A.

Request 2

State the number of each of the following, received by Ford, or of which Ford are 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 wheel separation;
- d. 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;
- e. Property damage claims;
- f. Third-party arbitration proceedings where Ford is or was a party to the arbitration; and
- g. Lawsuits, both pending and closed, in which Ford is or was a defendant or codefendant.

For subparts "a" through "f," state the total number of each item (e.g., consumer complaints, field reports, etc.) 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 a field report involving the same incident in which a crash occurred are to be counted as a crash report, a field report 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 Ford'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.

Answer

For purposes of identifying reports of incidents that may be related to the alleged defect and any related documents, Ford has gathered "owner reports" and "field reports" maintained by Ford Customer Service Division (FCSD), and claim and lawsuit information maintained by Ford's Office of the General Counsel (OGC).

Descriptions of the FCSD owner and field report systems, and the criteria used to search each of these, are provided in Appendix B.

The following categorizations were used in the review of reports located in each of these searches:

Category	Allegation
A1F	Fractured/broken wheel stud(s)/lug nut(s) – Front wheel
A1R	Fractured/broken wheel stud(s)/lug nut(s) – Rear wheel
A1U	Fractured/broken wheel stud(s)/lug nut(s) – Unknown wheel
A2	Wheel separation
A3F	Lug nut(s) loose/missing/tightened – Front wheel
A3R	Lug nut(s) loose/missing/tightened – Rear wheel
A3U	Lug nut(s) loose/missing/tightened – Unknown wheel
B1F	Fractured/broken wheel stud(s)/lug nut(s) during service/removal – Front wheel
B1R	Fractured/broken wheel stud(s)/lug nut(s) during service/removal – Rear wheel
B1U	Fractured/broken wheel stud(s)/lug nut(s) during service/removal – Unknown wheel
B2F	Stripped/seized wheel stud(s)/lug nut(s) – Front wheel
B2R	Stripped/seized wheel stud(s)/lug nut(s) – Rear wheel
B2U	Stripped/seized wheel stud(s)/lug nut(s) – Unknown wheel

We are providing electronic copies of reports categorized as "B" for your review because of the broad scope of the request. Based on our engineering judgment, the information in these reports is insufficient to support a determination that they pertain to the alleged defect.

Owner Reports: Records identified in a search of the Master Owner Relations Systems (MORS) database, as described in Appendix B, were reviewed for relevance and sorted in accordance with the categories described above. The number and copies of relevant owner reports identified in this search that may relate to the agency's investigation are provided in the MORS III portion of the database contained in Appendix C. The categorization of each report is identified in the "Category" field.

When we were able to identify that responsive (i.e., not ambiguous) duplicate owner reports for an alleged incident were received, each of these duplicate reports was marked accordingly, and the group counted as one report. In other cases, certain vehicles may have experienced more than one incident and have more than one report associated with their VINs. These reports have been counted separately.

Legal Contacts: Ford is providing, in Appendix B, a description of Legal Contacts and the activity that is responsible for this information. Ford did not identify any responsive (i.e., not ambiguous) owner reports that indicate that they are Legal Contacts.

Field Reports: Records identified in a search of the Common Quality Indicator System (CQIS) database, as described in Appendix B, were reviewed for relevance and sorted in accordance with the categories described above. The number and copies of relevant field reports identified in this search that may relate to the agency's investigation are provided in the CQIS portion of the database contained in Appendix C. The categorization of each report is identified in the "Category" field.

One field report that is duplicative of an owner report is provided in Appendix C but is not in the field report count.

VOQ Data: This information request had an attachment that included four Vehicle Owner Questionnaires (VOQs), three of which were duplicative of Ford reports. Ford made inquiries of its MORS database for customer contacts, and its CQIS database for field reports regarding the vehicles identified on the VOQs. Any reports located on a vehicle identified in the VOQs related to the alleged defect are included in the database provided in Appendix C.

Crash/Injury Incident Claims: For purposes of identifying allegations of accidents or injuries that may have resulted from the alleged defect, Ford has reviewed responsive owner and field reports, and lawsuits and claims. Ford has not identified any allegations of accidents or injuries.

Claims, Lawsuits, and Arbitrations: For purposes of identifying incidents that may relate to the alleged defect, Ford has gathered claim and lawsuit information maintained by Ford's OGC. Ford's OGC is responsible for handling product liability lawsuits, claims, and consumer breach of warranty lawsuits and arbitrations against the Company.

Lawsuits and claims gathered in this manner were reviewed for relevance and sorted in accordance with the categories described above. Ford has not located any responsive or ambiguous lawsuits, claims, or consumer breach of warranty lawsuits.

### Request 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. Ford'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, etc.);
- 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 wheel separation is alleged;
- j. Whether a crash is alleged;
- k. Whether property damage is alleged;

- i. Number of alleged injuries, if any; and
- m. 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 preformatted table which provides further details regarding this submission.

#### Answer

Ford is providing owner and field reports in the database contained in Appendix C in response to Request 2. To the extent information sought in Request 3 is available for owner and field reports, it is provided in the database.

#### Request 4

Produce electronic 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 Ford used for organizing the documents.

#### Answer

Ford is providing owner and field reports in the database contained in Appendix C in response to Request 2. To the extent information sought in Request 4 is available, it is provided in the referenced appendix.

#### Request 5

State, by model and model year, a total count for all of the following categories of claims, collectively, that have been paid by Ford to date that 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. Ford'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's 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
- k. Comment, if any, by dealer/technician relating to claim and/or repair.

Provide this 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.

#### Answer

Records identified in a search of the AWS database, as described in Appendix B, were reviewed for relevance and sorted in accordance with the categories described in the response to Request 2. The number and copies of relevant warranty claims identified in this search that may relate to the agency's investigation are provided in the AWS portion of the database contained in Appendix C. The categorization of each report is identified in the "Category" field.

When we were able to identify that duplicate claims for an alleged incident were received, each of these duplicate claims was marked accordingly and the group counted as one report. In other cases, certain vehicles may have experienced more than one incident and have more than one claim associated with their VINs. These claims have been counted separately. Warranty claims that are duplicative of owner and field reports are provided in Appendix C but are not included in the report count above.

Requests for "goodwill, field, or zone adjustments" received by Ford to date that relate to the alleged defect that were not honored, if any, would be included in the MORS reports identified above in response to Request 2. Such claims that were honored are included in the warranty data provided.

#### Request 6

Describe in detail the search criteria used by Ford to identify the claims identified in response to Request 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 Ford 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 Ford 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.

#### Answer

Detailed descriptions of the search criteria, including all pertinent parameters, used to identify the claims provided in response to Request 5 are described in Appendix B.

For 2009 through 2011 model year Ford Fusion and Mercury Milan vehicles, the New Vehicle Limited Warranty, Bumper-to-Bumper Coverage begins at the warranty start date and lasts for three years or 36,000 miles, whichever occurs first. For 2009 through 2011 model year Lincoln MKZ vehicles, the New Vehicle Limited Warranty, Bumper-to-Bumper Coverage begins at the warranty start date and lasts for four years or 50,000 miles, whichever occurs first. Optional Extended Service Plans (ESPs) are available to cover various vehicle systems, time in service, and mileage increments. The details of the various plans are provided in Appendix D. As of the date of the information request, 88,811 new vehicle ESP policies had

been purchased on 2009 through 2011 model year Ford Fusion, Lincoln MKZ, and Mercury Milan vehicles.

#### Request 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 Ford 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 Ford is planning to issue within the next 120 days.

#### Answer

For purposes of identifying communications to dealers, zone offices, or field offices pertaining, at least in part, to fracture of one or more wheel studs, wheel separation, improperly fastened lug nuts or excessive change/relaxation in wheel fastening clamp load following tightening of lug nuts, Ford has reviewed the following FCSD databases and files: The On-Line Automotive Service Information System (OASIS) containing Technical Service Bulletins (TSBs) and Special Service Messages (SSMs); Internal Service Messages (ISMs) contained in CQIS; and Field Review Committee (FRC) files. We assume this request does not seek information related to electronic communications between Ford and its dealers regarding the order, delivery, or payment for replacement parts, so we have not included these kinds of information in our answer.

A description of Ford's OASIS messages, ISMs, and the Field Review Committee files and the search criteria used are provided in Appendix B.

OASIS Messages: Ford has not identified any SSMs or TSBs that may relate to the agency's request.

Internal Service Messages: Ford has identified one ISM that may relate to the agency's request and is providing a copy in Appendix E.

Field Review Committee: Ford has not identified any field service action communications that may relate to the agency's request.

Ford is not aware of any forthcoming communications related to the alleged defect in the subject vehicles.

#### Request 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, Ford. 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 in interim, draft, or final form. Organize the documents chronologically by action.

#### Answer

Ford is construing this request broadly and is providing not only studies, surveys, and investigations related to the alleged defect, but also notes, correspondence, and other communications that were located pursuant to a diligent search for the requested information. Ford is providing the responsive, non-confidential Ford documentation in Appendix F.

To the extent that the information requested is available, it is included in the documents provided. Some documents are in the Spanish language. To ensure a timely response to this request, these documents have not been translated. There are many documents in English that provide very similar information. The majority of the information that is in Spanish involves communications within the assembly plant about repair procedures and plans for sorting/repairing vehicles that were involved in two stop ships. If the agency has questions concerning these documents or requires translation, please advise.

Ford is submitting additional responsive documentation in Appendix G with a request for confidentiality under separate cover to the agency's Office of the Chief Counsel pursuant to 49 CFR, Part 512.

In the interest of ensuring a timely and meaningful submission, Ford is not producing non-responsive materials or items containing little substantive information. Examples of the types of materials not being produced are meeting notices, raw data lists (such as part numbers or VINs) without any analytical content, duplicate copies, non-responsive elements of responsive materials, and draft electronic files for which later versions of the materials are being submitted. Through this method Ford is seeking to provide the agency with substantive responsive materials in our possession consistent with the timing defined by the agency. We believe our response meets this goal. Should the agency request additional materials, Ford will cooperate with the request.

#### Request 9

Describe all modifications or changes made by, or on behalf of, Ford in the design, material composition, manufacture, quality control, supply, or installation of the subject wheel types, 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 numbers (service and engineering) of the original component;
- e. The part number (service and engineering) of the modified component;

- 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 Ford is aware of which may be incorporated into vehicle production within the next 120 days.

#### Answer

A table of the requested changes is provided in Appendix H. In addition to the subject components, Ford is also providing parts change information for the rear brake rotor. There have been no changes that relate to or may relate to the alleged defect for any of the wheels or lug nuts on the subject vehicles.

#### Request 10

State the number of each of the following that Ford 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 the sale (including the cut-off date for sales, if applicable).

- a. Wheel studs;
- b. Wheel hubs/wheel hub assemblies; and
- c. Any kits that have been released, or developed, by Ford 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 Ford is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

#### Answer

As the agency is aware, Ford service parts are sold in the U.S. to authorized Ford and Lincoln-Mercury dealers. Ford has no means to determine how many of the parts were actually installed on vehicles, the vehicle model or model year on which a particular part was installed, the reason for any given installation, or the purchaser's intended use of the components sold.

Ford is providing the total number of Ford service replacement bearing assemblies (wheel hubs are integral to the bearing assembly) and wheel studs by part number (both service and engineering) and month/year of sale, where available, in Appendix I. Information pertaining to production and service usage for each part number, and supplier point of contact information, is included in Appendix I.

#### Request 11

Provide a table showing the following information for each wheel type used as original equipment in the subject vehicles:

- a. The part numbers for the road wheel, wheel hub, wheel stud and lug nut;
- b. The number of vehicles sold with the wheel type by make, model and model year;
- c. The number of incidents identified from all sources that relate to, or may relate to, (1) wheel stud fracture and (2) wheel separation due to wheel stud fracture, by make, model, model year and age interval (use the following age intervals: 0 to 15,000 miles; 15,000 to 30,000 miles; and greater than 30,000 miles); and
- d. The failure rates and Ford's assessment of which, if any, of the wheel types used in the subject vehicles show significantly greater failure rates than any of the other wheel types overall or in any stated age intervals.

Answer

Ford is providing the information requested in parts a. through c. in Appendix J. Ford's response to part d. is included in our response to Request 15.

Request 12

Produce each of the following:

- a. Two exemplar samples of each design version of the subject component;
- b. Two exemplar samples of each design version of lug nut manufactured for use as original equipment and/or service replacement on the subject vehicles;
- c. One exemplar sample of each design version of wheel hub assembly manufactured for use as original equipment and/or service replacement on the subject vehicles;
- d. One exemplar sample of each design version of steel wheel manufactured for use as original equipment and/or service replacement on MY2010 Ford Fusion vehicles; and
- e. Two field return samples of the subject component exhibiting the subject failure mode.

Answer

Ford has shipped the following parts to Mr. Kyle Bowker's attention:

Two samples of each version of the lug nut, total of six lug nuts  
One sample of the hub assembly (Front – FWD/AWD, Rear – AWD) including five wheel studs  
One sample of the bearing assembly (hub intergrated) (Rear – FWD) including five wheel studs  
One field returned sample of the bearing assembly exhibiting five broken wheel studs  
One sample of the rear brake rotor  
One field returned sample of the rear brake rotor exhibiting out of specification parallelism  
One sample of the steel wheel used on the 2010 model year Ford Fusion

Request 13

Produce copies of all engineering standards, performance specifications, quality assurance specifications, and documents related to the validation, manufacture, storage, transport, assembly and service of the subject components. State the basis for each

specification and standard related to the durability of the subject components. Also state whether and how the specification or standard addresses the effect of torque relaxation.

Answer

Ford is providing the requested information with a request for confidentiality under separate cover to the agency's Office of the Chief Counsel pursuant to 49 CFR, Part 512.

The documents related specifically to this request are located in the following folders within Confidential Appendix G:

Folder: Engineering Design Drawings, Bates Nos. PE11-003 000056-000060

Folder: Engineering Design Specifications, Bates Nos. PE11-003 000081-000247

Folder: Test Procedure, Bates Nos. PE11-003 000766-000770

Request 14

Provide the following information regarding lug nut torque requirements for the subject vehicles by make, model, model year and wheel type:

- a. State the torque specifications;
- b. State the minimum clamping load for each wheel stud/lug nut pair to adequately secure the wheel to the vehicle;
- c. State the minimum torque for each lug nut necessary to achieve and maintain the clamping load stated in Request No. 14.b;
- d. State the maximum torque that may be applied to each lug nut without wheel stud damage;
- e. Data regarding lug nut torque retention vs. time; and
- f. Produce copies of all documents related to each item within the scope of Request No. 14.

Answer

The torque specification for all wheel types available on the subject vehicles is 133Nm  $\pm$ 10%.

Ford's design practice is to specify a torque, as opposed to a clamp load, that is sufficient to meet the requirements set forth in the documents provided in response to Request 13. Information regarding requirements for lug nut torque retention over time is also included in the documents provided in response to Request 13. Ford does recommend that lug nuts be retightened to the specified torque 500 miles after any wheel disturbance. This information is included in the owner's guide.

Request 15

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

- a. The causal 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 reports included with this inquiry.

### Answer

The agency's alleged defect is extremely broad and encompasses not only fractured wheel studs and wheel separations but also includes wheel studs and lug nuts that are stripped, seized or loose, and/or fracture during wheel service. While Ford is providing all reports and claims that are responsive or are potentially responsive to this broad request, Ford's comments focus on those reports and warranty claims that allege either a fractured wheel stud or wheel separation (A1 and A2 categories). The following discussion addresses front wheel stud fractures and rear wheel stud fractures separately, because we have noted differences in the reported occurrences.

### Front

Ford has reviewed the reports and claims for front wheel stud fracture and found that the majority pertain to fracture of a single wheel stud. Ford's internal requirements, as provided in our response to Request 13, were developed to assure that the wheel will not separate from the vehicle with one wheel stud fractured or with one lug nut missing. As of the date of the inquiry, Ford has not received any allegations of front wheel separation; a small number of reports alleged more than one stud fracture on a front wheel. Of this small number of reports alleging more than one fractured front wheel stud, 40% of the reports are on five vehicles that were built the same day and sold to a single fleet customer. Ford is attempting to further understand any possible causes for this particular clustering of incidents in this small subset of vehicles. Analysis has also found that a majority of the front wheel stud fracture reports pertain to vehicles originally equipped with steel wheels; Ford is attempting to further understand this potential correlation.

### Rear

Prior to the opening of the agency's preliminary evaluation, Ford had been investigating allegations of rear wheel stud fracture and reports of rear wheel separation. In August 2010, the vehicle assembly plant (Hermosillo Stamping and Assembly Plant - HSAP), identified a condition in the plant where rear wheel studs were fracturing during the wheel installation process. Further, the rear wheel studs were breaking during assembly with greater frequency on front wheel drive vehicles that were equipped with steel wheels. A thorough review of the assembly processes and the wheel stud part quality was completed; no root cause for the in-plant rear wheel stud fractures was identified. Despite not finding a root cause of the concern, actions were taken to revise the wheel stud to a 10.9 grade stud and to revise the assembly processes by adding angle control to the lug nut torque process in an effort to better identify vehicles with possible wheel stud concerns and to reduce the number of in-plant wheel stud fractures.

Following these actions, Ford continued to monitor the field data for reports alleging rear wheel stud fracture. In late October 2010, field return parts were received and a thorough analysis found no anomalies in the material composition or microstructure of the rear wheel studs. The analysis did find that the wheel studs fractured in bending fatigue, not the more common tensile mode that is typically associated with over-torqued lug nuts. Dimensional analysis of a field returned rear brake rotor found it to be out of specification at the brake rotor to wheel hub

interface surface. The surface of the rear brake rotor has a specified parallelism and the field returned brake rotors demonstrated an out of specification parallelism condition at this surface. Ford believes that this condition may have contributed to the bending fatigue fracture of the field returned rear wheel studs. Ford notes that all subject vehicles are equipped with the same rear brake rotor; however, field data shows a significant difference in the performance between vehicles originally equipped with steel wheels and vehicles originally equipped with aluminum wheels.

Ford has received four allegations of rear wheel separation; these reports include three warranty claims and one field report. None of these reports allege a loss of vehicle control or crash. On all four of these vehicles, the rear brake rotors have been replaced and the parts from three of the vehicles have been returned. Analysis of these parts is ongoing. Ford's investigation to further understand the possible root causes and propensity of rear wheel stud fracture in vehicles originally equipped with steel wheels is ongoing.

#### Summary

The reports and claims provided in this response indicate that operators visually observe broken wheel studs or report hearing noises, or experiencing vibration, prompting them to bring the vehicle in for service, after which a broken wheel stud was identified as the cause of the noise or vibration. The majority of reports alleging a fractured wheel stud indicate that only one wheel stud is fractured. Ford design practice requires validation of proper wheel joint function with one missing lug nut and all other lug nuts at the minimum torque specification. Based on the available data, Ford believes that significant noise and/or vibration is present prior to any risk of a wheel separation, and that it is highly unlikely that a vehicle would fracture all five wheel studs simultaneously. This is supported by the number of reports of broken wheel studs without wheel separation. Ford is continuing to assess the data and reports associated with this subject and will keep the agency informed of our findings.

###

**2009 through 2011 Ford Fusion, Lincoln MKZ, and Mercury Milan  
Wheel Stud Fracture**

**OWNER REPORTS**

As the agency is aware, within FCSD's North American Customer Service Operations, there is a Customer Relationship Center (CRC) that is responsible for facilitating communication between customers, dealerships and Ford Motor Company. Among other things, the CRC handles telephonic, electronic, and written inquiries, suggestions, informational requests, and concerns ("contacts") from Ford and Lincoln-Mercury vehicle owners about their vehicles or sales and service experience. The contacts are handled by CRC customer service representatives who enter a summary of the customer contact into a database known as CuDL (Customer Data Link). Certain contacts, such as letters from customers, are entered into the CuDL database. More recently, the records in MORS III/CuDL are imaged and stored electronically.

The CRC assigns to each vehicle-related contact report a "symptom code" or category that generally characterizes the nature of the customer contact or vehicle concern, as described by the owner. The CRC does not undertake to confirm the accuracy of the description provided by the owner; they simply record what is reported. Therefore, given the complexity of the modern motor vehicle, it is Ford's experience that a significant percentage of owner contacts do not contain sufficient information to make a technical assessment of the condition of the vehicle or the cause of the event reported. Accordingly, although MORS contact reports may be useful in identifying potential problems and trends, the records are not the empirical equivalent of confirmed incidents and/or dealership's diagnosis. In the interest of responding promptly to this inquiry, Ford has not undertaken to gather the electronic images related to these contacts because of the largely duplicative nature of the information contained in the images, as well as the time and the burden associated with locating and producing those documents. The pertinent information related to those contacts generally would be included in the contact reports obtained from the CuDL system. To the extent that those documents exist, they are characterized in the comments of MORS III contact reports. Upon request, Ford will attempt to locate any specific items that are of interest to the agency.

In responding to this information request, Ford electronically searched CuDL using the following criteria:

Model Year: 2009 through 2011

Subject Vehicle: Ford Fusion, Lincoln MKZ, and Mercury Milan vehicles manufactured for sale or lease in the United States, District of Columbia, Puerto Rico, Northern Mariana Islands, Guam, American Samoa and the Virgin Islands.

Date Parameters: January 1, 2008 through February 8, 2011 (the date of this inquiry)

Types of Contacts: All, including suspended data, canceled contacts and inquiries

MORS III Symptom Code(s):

Symptom Category	Symptom Code	Symptom Description
Steering/Handling	3032	Pull/Drift
Steering/Handling	3033	Vibration/Shimmy
Steering/Handling	3034	Noise

Steering/Handling	3039	Not Listed – Steering/Handling
Tires/Wheels	3060	Unknown
Tires/Wheels	3061	Tire Wear
Tires/Wheels	3063	Removal of
Tires/Wheels	3064	Noise
Tires/Wheels	3065	Wheel Covers
Tires/Wheels	3068	Vibration
Tires/Wheels	3069	Not Listed – Tires/Wheels

MORS III Reason Code(s):

Reason Code	Description
07	Legal Contacts

**LEGAL CONTACTS**

Beginning in early 2008, most consumer complaints and all legal claim processing has been centralized in OGC within the Consumer Litigation team. A transition has occurred such that all legal contacts (including those formerly handled by "Litigation Prevention") are coordinated through this team.

Prior to the transition, there was a Consumer Affairs Department within FCSD that managed customer concerns, which could not be resolved by the Customer Relationship Center (CRC). Among other things, the Consumer Affairs Department had a section, known as "Litigation Prevention," that handled a variety of informal (i.e., non-litigation) claims, such as property damage claims or attorney demand claims.

The Litigation Prevention section had been centralized in the Consumer Affairs Department since 1995, in Dearborn, Michigan. Prior to that time, Litigation Prevention personnel operated on a regional basis. For matters that the Litigation Prevention section handled, there were typically paper files that reflected the handling, investigation and resolution of property damage claims.

The claims, known as "Legal Contacts" are entered into the CuDL database that the CRC uses to enter other customer communications. When a customer contact is designated as a Legal Contact, it is so indicated near the top of the contact report.

**FIELD REPORTS**

Within FCSD, there is a Vehicle Service & Programs Office that has overall responsibility for vehicle service and technical support activities, including the administration of field actions. That Office is the primary source within Ford of vehicle concern information originating from Ford and Lincoln-Mercury dealerships, field personnel, and other sources. The information is maintained in a database known as the Common Quality Indicator System (CQIS). The CQIS database includes reports compiled from more than 40 Company sources (e.g., Company-owned vehicle surveys, service technicians, field service and quality engineers, and technical hot line reports, etc.) providing what is intended to be a comprehensive concern identification resource. As with MORS contact reports, CQIS reports are assigned a "symptom code" or category that generally reflects the nature of the concern.

In responding to this information request, Ford electronically searched CQIS using the following criteria:



Model Year: 2009 through 2011

Subject Vehicle: Ford Fusion, Lincoln MKZ, and Mercury Milan vehicles manufactured for sale or lease in the United States, District of Columbia, Puerto Rico, Northern Mariana Islands, Guam, American Samoa and the Virgin Islands.

Date Parameters: January 1, 2008 through February 8, 2011 (the date of this inquiry)

Symptom Code(s):

Symptom Category	Symptom Code	Symptom Description
Steering/Handling	3032	Pull/Drift
Steering/Handling	3033	Vibration/Shimmy
Steering/Handling	3034	Noise
Steering/Handling	3039	Not Listed – Steering/Handling
Tires/Wheels	3060	Unknown
Tires/Wheels	3061	Tire Wear
Tires/Wheels	3063	Removal of
Tires/Wheels	3064	Noise
Tires/Wheels	3065	Wheel Covers
Tires/Wheels	3068	Vibration
Tires/Wheels	3069	Not Listed – Tires/Wheels

### **OASIS MESSAGES**

FCSD is responsible for communicating a variety of vehicle and service information, such as warranty information for up to the past 360 days, Extended Service Plan part coverage information, and technical repair information, to North American Ford and Lincoln-Mercury dealers. This information is communicated primarily through OASIS, which serves as an electronic link between Ford Motor Company and the dealers. OASIS covers all North American Ford and Lincoln-Mercury cars and light trucks, and medium and heavy-duty Ford trucks, for the ten most current model years. Technical diagnostic and repair information on OASIS is contained in Special Service Messages (SSMs) and Technical Service Bulletin (TSBs) titles and brief summaries. It should be noted that dealers cannot access brief summaries.

SSMs and TSB titles are coded in OASIS by model year and vehicle line, and may be coded to other specific vehicle attributes (body style, engine code, or vehicle identification number) and one or more OASIS Service Code(s). The dealers with access to OASIS usually search for information on the database by entering a VIN and the applicable Service Codes. SSMs and TSB titles that become inactive or superseded continue to be accessible by Ford employees, but no longer are accessible by the dealers. Dealers also are able to determine the recalls applicable to a particular vehicle by searching a particular VIN in OASIS. Recall information available on OASIS cannot be searched by Service Codes.

In responding to this information request, Ford searched Global OASIS for active, inactive, and superceded TSB titles and SSMs using the following search criteria:

Model Year: 2009 through 2011

Subject Vehicle: Ford Fusion, Lincoln MKZ, and Mercury Milan vehicles manufactured for sale or lease in the United States, District of Columbia, Puerto Rico, Northern Mariana Islands, Guam, American Samoa and the Virgin Islands.

Date Parameters: January 1, 2008 through February 8, 2011 (the date of this inquiry)

OASIS Service Code(s):

Symptom Category	Symptom Code	Symptom Description
Steering/Handling	3032	Pull/Drift
Steering/Handling	3033	Vibration/Shimmy
Steering/Handling	3034	Noise
Steering/Handling	3039	Not Listed – Steering/Handling
Tires/Wheels	3060	Unknown
Tires/Wheels	3061	Tire Wear
Tires/Wheels	3063	Removal of
Tires/Wheels	3064	Noise
Tires/Wheels	3065	Wheel Covers
Tires/Wheels	3068	Vibration
Tires/Wheels	3069	Not Listed – Tires/Wheels

The OASIS database also contains Broadcast Messages. Typically, these messages are directed to all dealerships and either are notifications of new SSMs/TSBs, or announcements with non-technical information (for example, "the Dealer Hotline will be closed today"). Broadcast Messages cannot be searched by OASIS service codes, and can be retrieved only while active (approximately 2 to 4 days). Ford has not undertaken to search for Broadcast Messages because Ford expects that any responsive information obtained with such a search generally would be non-substantive in nature or duplicative of the information obtained with the TSB title and SSM search described above.

### **INTERNAL SERVICE MESSAGES**

FCSD, as part of its technical support activities, maintains fleet and technical telephone "hotlines." During the early stages of Ford's efforts to identify and resolve potential vehicle concerns, hotline personnel may draft Internal Service Messages (ISMs) on CQIS for their internal use. The ISMs are assigned a CQIS "symptom code" or category that generally reflects the nature of the concern. An ISM can form the basis for an oral response over the technical hotline to an inquiry from an individual dealer or fleet technician. The ISMs, however, are not made available electronically to fleets and dealers. Therefore, although ISMs are not "issued" to dealers like OASIS messages, Ford is construing this request broadly to include ISMs that may be related to the alleged defect in the subject vehicles.

In responding to this information request, Ford searched CQIS for active ISMs using the following search criteria:

Model Year: 2009 through 2011

Subject Vehicle: Ford Fusion, Lincoln MKZ, and Mercury Milan vehicles manufactured for sale or lease in the United States, District of Columbia, Puerto Rico, Northern Mariana Islands, Guam, American Samoa and the Virgin Islands.

Date Parameters: January 1, 2008 through February 8, 2011 (the date of this inquiry)

CQIS Symptom Code(s):

Symptom Category	Symptom Code	Symptom Description
Steering/Handling	3032	Pull/Drift
Steering/Handling	3033	Vibration/Shimmy
Steering/Handling	3034	Noise
Steering/Handling	3039	Not Listed – Steering/Handling
Tires/Wheels	3060	Unknown
Tires/Wheels	3061	Tire Wear
Tires/Wheels	3063	Removal of
Tires/Wheels	3064	Noise
Tires/Wheels	3065	Wheel Covers
Tires/Wheels	3068	Vibration
Tires/Wheels	3069	Not Listed – Tires/Wheels

### **FIELD REVIEW COMMITTEE**

Ford's Field Review Committee reviews all potential field service actions, including safety recalls and customer satisfaction programs, and recommends appropriate actions to corporate management. A Vehicle Service & Programs representative serves as Secretary to the Field Review Committee. Following approval of a field service action, the Vehicle Service & Programs Office prepares and launches the action. A representative copy of the communication to Ford's dealers, fleets, and Regional offices announcing the field service action is maintained in the Field Review Committee files.

### **WARRANTY**

Ford's Analytical Warranty System (AWS) contains warranty claims and vehicle information for model years 1991 and forward for North America, and model years 1992 and forward for Europe.

Ford performed a search of AWS for potentially responsive reports using the following search criteria:

Model Year: 2009 through 2011

Subject Vehicle: Ford Fusion, Lincoln MKZ, and Mercury Milan vehicles manufactured for sale or lease in the United States, District of Columbia, Puerto Rico, Northern Mariana Islands, Guam, American Samoa and the Virgin Islands.

Date Parameters: January 1, 2008 through February 8, 2011 (the date of this inquiry)

Base Part Number(s):

1007 – wheel  
 1012 – wheel nut  
 1015 – wheel  
 1104 – wheel hub  
 1107 – wheel stud  
 1118 – wheel stud  
 1215 – bearing assembly (front and rear – AWD)  
 1N069 – bearing assembly (rear – FWD)

1K003 – wheel assembly

2C026 – rear brake rotor

Customer Concern Code(s):

CCC	Description
B65, V88	Wheel/hubcap Troubles
H06, V21	Vehicle Pulls Left While Braking
H07, V21	Vehicle Pulls Right While Braking
H08, V21	Vehicle Pulls While Braking
H25, V89	Constant Pull to Left
H26, V89	Constant Pull to Right
H27, V89	Constant Pull/Drift – Unspecified
H28, V89	Vehicle Pull/Drift (not while braking) – While Accelerating
N20, V49	Vehicle Vibrates Excessively at Idle
N22, V89	Vehicle Vibrates When Driving Below 45 MPH
N23, V89	Steering Wheel Vibration/Shimmy Below 45 MPH
N24, V89	Steering Wheel Vibration/Shimmy Above 45 MPH
N25, V89	Vehicle Vibrates When Driving Above 45 MPH
N27, V21	Vibration or Shudder While Braking
N28, V89	Steering Wheel Vibration – Unspecified
N29, V89	Vehicle Vibrates - Unspecified
TB3, V88	Vehicle Vibration (out of round will not balance)
TB8, V88	Pulls/Drifts

Word Searches:

The reports located using the search criteria described above were then searched using the Electronic Data Download System using a keyword process. Those reports that were identified by the keyword search described here were manually reviewed for relevance. Additionally, a random sample of reports that did not contain any keywords were reviewed to confirm that the keywords captured any reports that are likely to contain an allegation related to the alleged defect. This random sample confirmed that the keywords are appropriate. The following keyword searches were conducted:

Lug  
 Nut  
 Stud  
 Wheel  
 Brok\*  
 Crac\*  
 Frac\*  
 Off  
 Sep\*

PE11-003

FORD

3/25/2011

APPENDIX E

**REAR DISK SERVICE BRAKE - COMPONENT DAMAGE DURING REPAIRS :**

SOME 2010-2011 FUSION/MILAN/MKZ VEHICLE'S MAY ENCOUNTER DAMAGE WHEEL HUB STUDS, ONLY TO THE REAR WHEELS, DURING SERVICE BRAKE REPAIRS OR THROUGH REGULAR MAINTENANCE INTERVALS. THIS CONDITION MIGHT BE ATTRIBUTED TO THE AN IMPERFECTION OR AN OUT-OF SPECIFICATION FLATNESS OF THE REAR DISK BRAKE ROTOR FACE TO WHEEL MOUNTING SURFACE. TO CHECK AND CORRECT THIS CONDITION, PERFORM THE FOLLOWING:

1. REMOVE THE REAR DISK BRAKES ROTORS FROM THE VEHICLE, PER WORK-SHOP MANUAL SECTION 206-04.
2. PLACE THE REAR DISK BRAKE ROTOR ON A BENCH OR FLAT SURFACE FACING UP. (WHERE ROTOR AND WHEEL ASSEMBLY MEETS)
3. USE A STRAIGHTEDGE EDGE ACROSS THE WHEEL MOUNTING SURFACE OF THE DISK BRAKE ROTOR WITH A FEELER GAUGE SET, AND DETERMINE IF ANY WARPAGE IS PRESENT ON THE SURFACE OF THE DISK BRAKE ROTOR.
4. DETERMINE IF MORE THAN 0.20 MM OF GAP IS BETWEEN THE STRAIGHT EDGE AND THE DISK BRAKE ROTOR.
5. IF THE GAP IS LARGER THAN 0.20 MM EXISTS, REPLACE REAR ROTOR.
6. IF DAMAGE TO THE WHEEL STUD ASSEMBLY IS PRESENT, REPLACE ALL FIVE WHEEL STUDS PER EACH WHEEL.

7. IF ONE OR MORE WHEEL STUDS ARE FOUND DAMAGED, DURING THE REPAIRS, REPLACE ALL 10 STUDS FOR BOTH REAR WHEELS.

DISK BRAKE ROTOR PART #: 9E5Z-2C026-B  
REAR STUD TO HUB ASSEMBLY PART #:  
7E5Z-1107 -A

CURRENTLY ENGINEERING IS INVESTIGATING THIS CONDITION, AND EXPECTS TO HAVE A RESOLUTION BEFORE THE END OF THE FIRST QUARTER OF 2011. CURRENT SERVICE PARTS ARE CLEAN. MONITOR OASIS FOR UPDATES.

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