

*5/10/07*

May 3, 2007

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OFFICE

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Vehicle Integrity Division  
Office of Defects Investigation  
NHTSA Enforcement  
Room #5326  
400 Seventh Street, S.W.  
Washington, D.C. 20590

N070067

NVS-212lhs  
PE07-011

Dear Mr. Cooper:

This letter is General Motors' (GM) response to your information request (IR), dated March 12, 2007, regarding allegations of structural failure of the windshield wiper linkage, installed in 2003 model year (MY) Saturn ION vehicles manufactured by General Motors (GM) for sale or lease in the United States.

Your questions and our corresponding replies are as follows:

1. **State, by model and model year, the number of subject vehicles GM has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by GM, 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 delivered for sale or lease).**

**Provide the table in Microsoft Access 2000, or a compatible format, entitled "PRODUCTION DATA."**

General Motors is providing the number of subject vehicles produced for sale or lease in the United States by make, model and MY in Table 1 below:

MAKE/MODEL	2003 MY
Saturn ION	96,312

TABLE 1 VEHICLE PRODUCTION

The production information requested in 1a-1g is provided on the on the Att\_1\_GM disk in the folder labeled Q\_01 refer to the Microsoft Access 2000 file labeled, "Q\_01\_PRODUCTION DATA". GM is providing the state where the vehicle was shipped in response to request 1g. For some of the subject vehicles, which have incomplete warranty files, the GM warranty system does not contain a warranty start date or state where the vehicle was shipped and, therefore, these fields are blank in the Microsoft Access 2000 file.

2. **State the number of each of the following, received by GM, or of which GM is otherwise aware, that 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 an injury or death, notices received by GM alleging or proving that an injury or death was related to or resulted from the alleged defect in a subject vehicles;
- d. Property damage claims, including claims of a loss of vehicle control and/or accident in which impaired driver visibility due to the alleged defect is alleged to have contributed to the occurrence;
- e. Third-party arbitration proceedings where GM is or was a party to the arbitration; and,
- f. Lawsuits, both pending and closed, in which GM is or was a defendant or codefendant.

For subparts "a" through "c," 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 GM's assessment of the problem, with a summary of the significant underlying facts and evidence. For item "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.

Table 2-1 below summarizes records that could relate to the alleged defect. GM has organized the records by the GM file number within each attachment. To date, GM's investigation of the alleged defect has not included an assessment of the cause(s) of each incident responsive to Request No. 2. Some incident reports may not contain sufficient reliable information to accurately assess cause.

TYPE OF REPORT	GM REPORTS	SUBCATEGORIES			
		CORRESPONDING TO NHTSA REPORTS	NUMBER WITH PROPERTY DAMAGE	NUMBER WITH CRASH	NUMBER WITH INJURY/FATALITY
Owner Reports	28	0	0	0	0
Field Reports	0	0	0	0	0
Not-In-Suit Claims	0	0	0	0	0
Subrogation Claims	0	0	0	0	0
Third Party Arbitration Proceedings	0	0	0	0	0
Product Liability Lawsuits	0	0	0	0	0
Total Reports (Including Duplicates)	28	0	0	0	0
Total Vehicles with Reports (Unique VIN)	28	0	0	0	0

TABLE 2-1: REPORT BREAKDOWN

The sources of the requested information and the last date the searches were conducted are tabulated in Table 2-2 below.

SOURCE SYSTEM	LAST DATE GATHERED
Customer Assistance Center	03/23/07
Technical Assistance Center	03/16/07
Field Information Network Database (FIND)	03/15/07
Field Product Report Database (FPRD)	03/15/07
Company Vehicle Evaluation Program (CVEP)	03/14/07
Captured Test Fleet (CTF)	03/14/07
Early Quality Feedback (EQF)	03/14/07
Legal / Employee Self Insured Services (ESIS)/Product Liability Claims/ Lawsuits	03/16/07

TABLE 2-2: DATA SOURCES

3. For each item (complaint, field report, claim, notice, or matter) within the scope of GM's response to Request No. 2, state the following information:
- GM's file number or other identifier used;
  - The category of the item, as identified in Request No. 2 (i.e., consumer complaint, field report, etc.);
  - Vehicle owner or fleet name (and fleet contact person), address, and telephone number;
  - Vehicle's VIN;
  - Vehicle's make, model and model year;
  - Vehicle's mileage at time of incident;
  - Incident date;
  - Report or claim date;
  - Whether a crash is alleged;
  - Whether property damage is alleged;
  - Number, type, and severity of alleged injuries, if any; and,
  - Number of alleged fatalities, if any.

Provide this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER TWO DATA."

The requested information is provided on the Att\_1\_GM disk in the folder labeled Q\_03 refer to the Microsoft Access 2000 file labeled, "Q\_03\_REQUEST NUMBER TWO DATA".

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 GM used for organizing the documents.

Copies of the records summarized in Table 2-1 are on the Att\_1\_GM disk embedded in the folder labeled Q\_03; refer to the Microsoft Access 2000 file labeled, "Q\_03\_REQUEST NUMBER TWO DATA". GM has organized the records by the GM file number within each attachment.

5. State a total count for all of the following categories of claims, collectively, that have been paid by GM to date that relate, 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. GM'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.

Table 5-1 summarizes the regular and extended warranty claims for the subject vehicles that were collected by searching the labor codes that may be related to the alleged defect. A summary of the warranty claims, including the information requested in 5(a-k), is provided on the Att\_1\_GM disk in the folder labeled Q\_05; refer to the Microsoft Access 2000 file labeled, "Q\_05\_WARRANTY DATA."

MAKE/MODEL	2003 MY REGULAR WARRANTY	2003 EXTENDED WARRANTY	TOTAL
Saturn ION	1,693	717	2,410

TABLE 5-1 WARRANTY CLAIMS

The sources of the requested information and the last date the searches were conducted are tabulated in Table 5-2 below.

SOURCE SYSTEM	LAST DATE GATHERED
GM CARD - regular warranty	03/14/07
Motors Insurance Corporation (MIC) - extended warranty	03/19/07
Universal Warranty Corporation (UWC) - extended warranty	03/30/07

TABLE 5-2: DATA SOURCES

The warranty data provided has limited analytical value in analyzing the field performance of a motor vehicle component. The warranty records do not contain sufficient information to establish the condition of the part at the time of the warranty correction; and service personnel may not consistently use the appropriate labor and trouble codes. Warranty numbers represent claims by our dealers for reimbursement for parts and labor costs incurred in performing warranty service for our customers. Consequently, some of these warranty claims are not related to the alleged defect.

GM's warranty database does not contain the following information: vehicle owner's name or telephone number, replacement part number description, or customer concern statement. GM is providing a field labeled "Verbatim Text" in response to request 5K (dealer/technician comment). The verbatim text is an optional field in the GM warranty system for the dealer to enter any additional comments that may be applicable to the warranty claim. The verbatim text field is not required to be completed for every warranty claim.

The MIC extended warranty system does not contain the following information: repairing dealer code, vehicle owner information, trouble code, trouble code description, part number, part description or verbatim. The UWC extended warranty system does not use the GM labor code or labor code

description and it does not contain the repairing dealer code, trouble code or trouble code description.

6. Describe in detail the search criteria used by GM 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 the terms of the new vehicle warranty coverage offered by GM 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) related to the alleged defect that GM offered for the subject vehicles and state the number of vehicles that are covered under each such extended warranty.

The GM regular warranty, MIC and Universal Warranty Corporation (UWC) claims that may relate to the subject condition were collected by searching for the labor codes listed in Table 6-1 below.

LABOR CODE	DESCRIPTION:
B1789	Link, Wiper Windshield (ONE/BOTH REPLACE)
Z1241	PRODUCT LIABILITY/INVESTIGATION REP PR (GOODWILL)
Z1242	PAR – REPAIRS/REIMBURSEMENT (GOODWILL)

TABLE 6-1 LABOR CODES USED IN WARRANTY SEARCH

The labor codes Z1241 and Z1242 can be used by dealers for reimbursement for goodwill warranty repairs. They are not specific to replacement of the subject components. Labor code B1789 is used by dealers for reimbursement for warranty repairs related to replacement of the subject component.

GM reviewed the warranty claims with these labor codes. Claims that clearly did not relate to replacement of subject components or structural failure of the windshield wiper linkage based on a review of the dealer verbatim, customer code, trouble code, repair cost or vehicle VIN are not being provided.

The warranty data provided has limited analytical value in analyzing the field performance of a motor vehicle component. The warranty records do not contain sufficient information to establish the condition of the part at the time of the warranty correction; and service personnel may not consistently use the appropriate labor and trouble codes. Warranty numbers represent claims by our dealers for reimbursement for parts and labor costs incurred in performing warranty service for our customers.

The subject vehicles are covered by a bumper-to-bumper new vehicle warranty for three years or 36,000 miles whichever occurs first. Many different extended warranty options are available through GM dealerships. They are offered at different prices and for varying lengths of time, based on customer's preference, up to 7 years from the date of purchase or up to a total of 100,000 vehicle miles. The General Motor's warranty system does not contain information on the number of vehicles that have extended warranty coverage. The number of extended warranty coverage contracts on the subject vehicles that have been sold by MIC regardless of status (in-force, expired, cancelled) as of March 19, 2007 is contained in Table 6-3.

MAKE/MODEL	2003 MY
Saturn ION	57,857

TABLE 6-4: MIC EXTENDED WARRANTY COVERAGE CONTRACTS SOLD

- 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 GM 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 such communication that GM may be planning to issue within the next 120 days.**

GM issued a service information bulletin on August 25, 2003 for windshield wiper chatter or hop across the windshield during wiper operation. Service Information Bulletin #03-08-43-004 – (08/25/2003) instructed dealers to install new wiper arm and blade assemblies, using wiper arm removal tool J 39637, to address customer comment on windshield wipers chattering or hopping across the windshield. As indicated in response to item No.8 below, a survey of dealers (reference Action 8L) subsequent to the issuance of the bulletin indicated that none of them routinely use the proper removal tool when conducting wiper arm replacements. Removing the wiper arm without using the proper tool can result in damage to the pivot housing and wiper module replacement. Consequently, repairs improperly made for the condition described in the bulletin may be related to the subject condition.

General Motors is not planning to issue in the next 120 days, any service, warranty or other technical documents or communications to its dealers, regional offices, zone offices or other entities regarding the subject condition in the subject vehicles.

The bulletin is included on the Att\_1\_GM disk in the folder labeled Q\_07; refer to the folder labeled, "Q\_07\_BULLETINS." The preceding information was collected from GM Service Operations. The data collection was completed on March 27, 2007.

- 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, GM. 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;**
  - 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.**

The Wiper Module and Wiper Transmission Assemblies are designed and manufactured by Robert Bosch LLC (Bosch). Its components are produced from around the world and the final manufacturing assembly is done in Toluca Mexico.

The information listed in Table 8-1 below is a summary of actions that have been conducted, are being conducted, are planned, or are being planned by or for GM regarding the subject condition on the subject vehicles as of April 11, 2007. Documents and additional supporting information are included in the Attachments as noted in the table.

**Action 8-A: GM Subsystem Technical Specifications for wiper systems.**

**Start Date:** 09/1998

**End Date:** 11/2002

**Engineering Group:** GM Body Exteriors Engineering

**Attachments:** Documents can be found on the Att\_2\_GM confidential disk in the folder labeled Q\_08, refer to the file labeled, Q\_08\_A GM WS SSTS.

**Description:** The GM Wiper Subsystem Technical Specifications provides detailed engineering requirements for Tier I wiper suppliers. It outlines both component and vehicle type requirements that are needed to design and engineer a wiper system.

**Summary of Action:** The wiper system in the subject vehicles met the GM Wiper Subsystem Technical Specifications.

**Action 8-B: Robert Bosch LLC Technical Customer Document.**

**Start Date:** 04/1999

**End Date:** 04/2003

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the file labeled, Q\_08\_B Bosch TCD.

**Description:** Technical Customer Document provides a list of testing parameters to be used at/by Bosch to validate their wiper design according to the GM SSTS requirements.

**Summary of Action:** As part of the pivot tube/pivot housing connection crimp verification, the original TCD specified a pivot housing to frame turning moment force test requirement that only applied to metal pivot housings, not plastic pivot housings. The specification was updated prior to production to modify the frame turning moment force requirement to reflect forces associated with plastic pivot housing designs.

**Action 8-C: Wiper System; GM Design Failure Mode Effects Analysis (DFMEA), Bosch Design Failure Mode Effects Analysis (DFMEA), Bosch Manufacturing Process Failure Mode Effects Analysis (PFMEA).**

**Start Date:** 04/1999

**End Date:** 05/2002

**Engineering Group:** GM Body Exteriors Engineering and Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_2\_GM confidential disk in the folder labeled Q\_08, refer to the file labeled, Q\_08\_C1 GM WS DFMEA and the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the files labeled, Q\_08\_C2 Bosch DFMEA and Q\_08\_C2 Bosch PFMEA.

**Description:** The GM DFMEA provided is for the wiper module as a component of the wiper system. The Bosch DFMEA and PFMEA are related only to the wiper module component.

**Summary of Action:** Documents used in the wiper module design as a component of the wiper system and the design and manufacture of the wiper module.

**Action 8-D: Wiper System Finite Element Analysis (FEA).**

**Start Date:** 04/2000

**End Date:** 04/2000

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the file labeled, Q\_08\_D Bosch FE-Analysis.

**Description:** FEA was performed on overall system with three different types of pivot housing materials (1 zinc and 2 types of Acetal plastic).

**Summary of Action:** FEA of the pivot housings is contained in the analysis report.

**Action 8-E: Design Validation test results with test reports.**

**Start Date:** 09/2000

**End Date:** 03/2001

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the files in the folder labeled, Q\_08\_E DV Test docs.

**Description:** Design Validation testing cover memo, Delta design validation plan and validation test reports.

**Summary of Action:** No issues or failures found with pivot housing design.

**Action 8-F: Bosch Wiper Module Assembly Control Plan**

**Start Date:** 02/2001

**End Date:** 02/2002

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the files in the folder labeled, Q\_08\_F Control Plan.

**Description:** Manufacturing control plan describes the hourly/daily/week/ checks to be made during the manufacturing process of a wiper module assembly.

**Summary of Action:** Specific checks relating to the pivot housings can be found on page 3/6. No changes to control plan were made after start of production.

**Action 8-G: Bosch Moldflow Simulation for Wiper Pivot Housings**

**Start Date:** 04/2001

**End Date:** 04/2001

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the files in the folder labeled, Q\_08\_G Moldflow.

**Description:** Moldflow analysis is performed to assess molding characteristics of a part design, establish recommended mold settings, and identify the optimized gate (injection point) location for a given design (based on part geometry) to reduce molding defects.

**Summary of Action:** Analysis recommendations were used in production.

**Action 8-H: Bosch Wiper Module Assembly GP12 (pre-launch) Control Plan**

**Start Date:** 07/2001

**End Date:** 04/2002

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the files in the folder labeled, Q\_08\_H GP-12 CP.

**Description:** A GP12 manufacturing control plan is an increased amount of manufacturing checks (control plan) during the launch of a new vehicle to ensure the product and manufacturing process are stabilized.

**Summary of Action:** Specific checks relating to the pivot housings can be found on page 6/7. Additional 4 parts per week were checked for proper pivot housing crimping.

**Action 8-I: Aspel (Tier II pivot housing supplier) Control Plan**

**Start Date:** 12/2001

**End Date:** 04/2004

**Engineering Group:** Aspel

**Attachments:** GM has requested a copy of the Aspel Control Plan in English. The document will be provided when it becomes available.

**Description:** Manufacturing control plan for injection molding process that describes the hourly/daily/week/ checks to be made to subject vehicle wiper pivot housings.

**Summary of Action:** Part weight check was changed from characteristic check (random) to a daily check. It was determined that a deviation be granted to remove the verification that no vacuum hole (void) sizes of >0.2mm as the verification was not practical. Bosch to define new mechanical break off test as replacement.



<p><b>Action 8-J: Production Wiper Module Design Validation Plan and Reports (DVP&amp;R).</b> <b>Start Date:</b> 04/2002 <b>End Date:</b> 09/2002 <b>Engineering Group:</b> Robert Bosch LLC <b>Attachments:</b> Documents can be found on the Att_3_Bosch confidential disk in the folder labeled Q_08, refer to the folder labeled, Q_08_J DVP &amp; R. <b>Description:</b> Production Validation testing confirms production design that is manufactured with production tooling meets requirements. <b>Summary of Action:</b> No issues found with pivot housing design.</p>
<p><b>Action 8-K: PRTS N143253 is issued to GM Engineering.</b> <b>Start Date:</b> 09/2003 <b>End Date:</b> 04/2006 <b>Engineering Group:</b> GM Engineering and Robert Bosch LLC <b>Attachments:</b> Documents including the supplier analysis comments can be found on the Att_2_GM confidential disk in the folder labeled Q_08, refer to the file labeled, Q_08_K PRTS. <b>Description:</b> This PRTS is on a 2004MY durability vehicle experiences broken wiper system at GM's Milford Proving Grounds. During removal of the wiper system it was found to have fractured driver side pivot housing. <b>Summary of Action:</b> PRTS N143253 closed because investigation reveals extensive reworks were performed on this vehicle and it is believed the wiper module was forcefully overloaded during one of these reworks. Additionally, part in vehicle was an older prototype sample not manufactured from the production process. GM Warranty Parts Return system engaged to retrieve wiper transmissions replaced under warranty for further analysis.</p>
<p><b>Action 8-L: Warranty Task Team</b> <b>Start Date:</b> 03/2004 <b>End Date:</b> 06/2004 <b>Engineering Group:</b> GM Engineering and Robert Bosch LLC <b>Attachments:</b> Documents can be found on the Att_3_Bosch confidential disk in the folder labeled Q_08, refer to the folder labeled, Q_08_L Warr Analysis. <b>Description:</b> A Team of Engineers were assigned to investigate warranty claims. Their tasks were; A) identify the failure mechanism seen in warranty, B) investigate any and all tier II supplier changes, C) re-validate the existing wiper system, D) use extreme test methods to re-create the failures observed in warranty, F) develop/create a pivot housing component break test to possibly add to pivot housing molder's control plan. <b>Summary of Action:</b> The failure mechanism was identified as a deliberate vertical overload condition. This vertical overload condition was observed during the process of removing a wiper arm by rocking it back and forth to disengage it from the pivot shaft knurls. Typically, this operation is conducted with Kent-Moore tool #J-39637 but a dealer survey was conducted, the results indicated none of the dealers routinely use this tool. Responses from the housing molder (Aspel) do not indicate any changes were made to raw material, injection molding parameters, or the control plan. The wiper module manufacturer (Bosch) also reviewed frame tube to pivot housing processes and did not find any variation in their process. Multiple current production wiper systems were re-tested to the validation test requirements verifying conformity to specifications and GM's validation test requirements including Accelerated Life Testing Analysis (ALTA) testing.</p>
<p><b>Action 8-M: Bosch Final Warranty Report</b> <b>Start Date:</b> 04/2004 <b>End Date:</b> 05/2004 <b>Engineering Group:</b> Robert Bosch LLC <b>Attachments:</b> Documents can be found on the Att_3_Bosch confidential disk in the folder labeled Q_08, refer to the folder labeled, Q_08_M WR final. <b>Description:</b> Bosch, the wiper module supplier, reviewed the Warranty Task Team's findings. <b>Summary of Action:</b> Report was considered by Warranty Task team (see Action 8L).</p>

**Action 8-N: Finite Elemental Analysis (FEA) for Structural Improvement**

**Start Date:** 04/2004

**End Date:** 01/2005

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the folder labeled, Q\_08\_N FEA.

**Description:** The subject vehicle wiper system was being considered for a new vehicle the 2005 MY Chevrolet Cobalt. The wiper system in the new vehicle would see higher loads on the pivot housing than those in the subject vehicles due to wiper system design constraints in the new vehicle. FEA was conducted to evaluate proposed design improvements in the pivot housings for use in the new vehicle with these higher loads on the pivot housing.

**Summary of Action:** FEA shows a stress reduction on pivot housings with proposed rib design improvement. These results of the FEA were to be used in an assessing continuous improvement in the subject vehicle wiper system.

**Action 8-P: Webster (new tier II pivot housing supplier) Control Plan**

**Start Date:** 07/2003

**End Date:** 02/2007

**Engineering Group:** Webster Plastics

**Attachments:** Bosch and GM have requested that Aspel provide a request for confidentiality of their Control Plan. It has not been received, the document will be provided as soon as Webster provides a request for confidentiality.

**Description:** Webster's manufacturing control plan for injection molding process that describes the hourly/daily/week/ checks to be made on GMX357 wiper pivot housings.

**Summary of Action:** Bosch pivot housing stud break off test was incorporated into Webster's control plan before production startup. Specific checks can be found on page 11/14.

**Action 8-Q: Production Validation Testing for Added Ribs**

**Start Date:** 07/2004

**End Date:** 08/2004

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the folder labeled, Q\_08\_Q PV rib tests.

**Description:** Bosch validation plan and supporting test reports for the modified pivot housing designs with new vertical ribbing.

**Summary of Action:** Conduct durability, snow load, snow blocking, and B vs. C accelerated life testing (stress probe testing) from original production validation plan. Additional testing to include stud break off and arm serviceability (removal) test. New pivot housings with vertical ribbing meet all specifications and successfully completed all validation testing.

**Action 8-R: Bosch Wiper Module Assembly Control Plan**

**Start Date:** 10/2004

**End Date:** 12/2006

**Engineering Group:** Robert Bosch LLC

**Attachments:** Documents can be found on the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the file labeled, Q\_08\_R Rib CP.

**Description:** Manufacturing control plan describes the hourly/daily/week/ checks to be made during the manufacturing process of a wiper module assembly.

**Summary of Action:** Specific checks relating to the pivot housings can be found on pages 7/22 and 21/22.

**Action 8-S: GM Product Investigations ION Wiper Investigation**

**Start Date:** 12/2005

**End Date:** 02/2006

**Engineering Group:** GM Product Investigations

**Attachments:** Documents can be found on the Att\_1\_GM disk in the folder labeled Q\_08, refer to the folder labeled, Q\_08\_S ISR.

**Description:** GM investigation initiated to investigate warranty reports, analyze returned parts and determine the effect on vehicle performance.

**Summary of Action:** Warranty analysis did not indicate further action required.

9. **Describe all modifications or changes made by, or on behalf of, GM in the design, material composition, manufacture, quality control, supply, or installation of the subject components, from the start of production to date, which relate, 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 GM is aware of which may be incorporated into vehicle production within the next 120 days.**

GM is providing a summary of the product engineering information requested in 9(a-h) on the Att\_1\_GM disk in the folder labeled Q\_9; refer to the file labeled, Q\_9\_A Modifications. Reference Action 8-R included in response to item 8 for the responsive information regarding a change in the Robert Bosch LLC Quality Control Plan.

GM is not planning to incorporate any modifications or changes into production of the subject vehicles that relate to the alleged defect within the next 120 days.

10. **Provide a sample each of a wiper module representing the original and each subsequent modification that may be related to the alleged defect. Also provide a sample of a field failed wiper module.**

The original wiper module installed in the subject vehicles is no longer being produced for production or service. GM has not been able to locate a sample of the original windshield wiper module.

Enclosure 10 contains a sample of the modified wiper module with added ribbing to the pivot housing. This modified wiper module was implemented into 2005 MY vehicle production in January 2005.

Enclosure 10 also contains a sample of an original version wiper module with a broken pivot housing. The failure mechanism of the enclosed sample is an overload condition on the pivot housing in the vertical direction that resulted when the driver of the vehicle grabbed the wiper arm while the wiper was in motion. A visual inspection of this module revealed the housing was cracked for a period of time prior to the final fracture.

11. **Provide a complete engineering description and appropriate engineering specifications of the subject components installed in the subject vehicles. 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 GM is aware, equipped with identical subject components as the subject vehicles, whether installed in production or in service, and state the applicable dates of production or service usage.**

The windshield wiper system removes precipitation and/or environmental contamination from the windshield. The wiper function is provided using an electric motor to drive wiper arms and blades to wipe the surface of the windshield in a designated pattern across the windshield. This is accomplished through the wiper transmission, a windshield wiper component that includes levers, links and shafts. Drawings and specifications of the windshield wiper system module assembly are contained on the Att\_2\_GM confidential disk in the folder labeled Q\_11, refer to the folder labeled Q\_11\_Drawings.

The wiper transmission includes a driver and passenger pivot housing attached to each end of the wiper transmission frame tube. Pivot housings are mechanisms used to provide pivot shaft axial support and to maintain proper shaft angularity for the wiper arms. Together the pivot housings provide a dimensionally stable structure for the moving linkages to rotate about. Throughout the automotive industry pivot housings are designed and manufactured using both plastic and metal materials. Drawings of the wiper transmission pivot housing are contained on the Att\_3\_Bosch confidential disk in the folder labeled Q\_11, refer to the folder labeled Q\_11\_Drawings. The pivot housing material specifications are provided on the Att\_1\_GM disk in the folder labeled Q\_11, refer to the file labeled, Q\_11\_material specs. The 2003-2007 MY Saturn ION vehicles have a unique wiper module that is not used on any other vehicles.

The supplier of the subject vehicle wiper module is;

Robert Bosch LLC  
15000 Haggerty Road  
Plymouth, MI 48170

Frank Katzenmeier, Engineering Manager  
734-979-3272.

12. **Provide GM'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.**

The windshield wiper module installed in the subject vehicles is well designed. The warranty rate for replacement of failed wiper modules is low, and GM is not aware of any crashes or injuries related to the subject condition. The wiper module has successfully completed extensive validation testing without incident, including durability testing and snow block testing that is designed to test, without failure, functionality of the wiper module in conditions that simulate 10 years of normal operation in Buffalo, New York.

GM's response to item No. 8 contains the validation and testing documentation that demonstrates the wiper module meets or exceeds all design, serviceability and validation requirements. The warranty task team found that the manufacturer of the wiper module followed the control plans and did not find any changes or discrepancies related to the subject condition.

The failure mechanisms and failure modes for the windshield wiper module assembly installed in the subject vehicles are contained on the Att\_2\_GM confidential disk in the folder labeled Q\_08, refer to the file labeled, Q\_08\_C1 GM WS DFMEA and the Att\_3\_Bosch confidential disk in the folder labeled Q\_08, refer to the files labeled, Q\_08\_C2 Bosch DFMEA.

GM's assessment of the subject condition, based on the actions detailed in response to item 8 above, is that the wiper module pivot housing in the subject vehicle may crack and/or fracture as a result of an overload condition applied to the wiper pivot housing during improper removal of the wiper arms. Once a crack has been initiated, secondary dependent contributors include continued usage of the wipers under normal operating conditions, as well as higher than normal loads during restricted operating conditions such as those experienced with heavy snow or ice build up.

The warranty task team determined through a field survey that dealers do not routinely use the wiper arm removal tool when servicing the wiper arms. Improper removal of the wiper arms results in excessive forced wiper arm motion. The wiper arms are removed when the windshield is replaced, the wiper arms are replaced and/or the wiper motor is replaced. Repairs to the washer hoses, washer nozzles and cowl panel also require removal of the wiper arms. When the wiper arms are removed by force using a rocking or rotational motion, instead of using the proper wiper arm removal tool, the pivot housing is overloaded and the pivot housing may crack or fracture during this process. The driver and passenger side pivot housings can be damaged in this manner.

If the pivot housing is completely fractured during a repair, the technician would likely replace the wiper transmission. However, if the housing is cracked, the wipers will operate normally for an unknown period of time until the housing completely fractures. Once the pivot housing is completely fractured it becomes evident to the vehicle operator, as the wiper arm may appear loose with erratic arm movement and the wipers may not operate through their designed wiping pattern.

The repairs or replacements noted above may have been done by a GM dealer or an independent service technician. The GM warranty system only includes information regarding repairs done by GM dealers.

Analysis of the GM warranty data indicates that 23% of the claims for replacement of the wiper module are:

- a) preceded by a repair or replacement that required removal of the wiper arms, or
- b) contain trouble codes or customer complaint codes that indicate the warranty repair may be related to windshield wipers chattering or hopping across the windshield.

GM does not believe that this condition poses an unreasonable risk to motor vehicle safety because:

- The rate for wiper module replacement in the subject vehicles is low, at 16.8 IPTV at 36 months of service. This rate is reduced to 15.6 IPTV at 36 months of service when the warranty claims that contain trouble or customer complaint codes indicating the repair was related to wipers chattering or hopping across the windshield are removed.
- The failure can be progressive with some warning.
- The failure can be on the driver side or passenger side with partial visibility maintained.
- GM is not aware of any crashes or injuries as a result of this condition.

GM reviewed the 4 incident reports (VOQs) included with this inquiry. GM has concluded that these incident reports may be related to the subject condition. GM has not examined the wiper modules that are the subject of the VOQs; therefore, GM has not identified the specific contributory factors related to each of the alleged failures.

\* \* \*

General Motors requested assistance and documents from suppliers in responding to items 8, 9, 10, 11 and 12. GM requested that all documents be supplied in English; however, a few of the documents we received are in German. This response includes the documents as received from suppliers. GM has requested that the documents received in German be translated, they will be provided in English when available.

This response is based on searches of General Motors Corporation (GM) locations where documents determined to be responsive to your request would ordinarily be found. As a result, the scope of this search did not include, nor could it reasonably include, "all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of their headquarters, regional, zone and other offices and their employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or indirectly (e.g., employee of a consultant) by or under the control of GM (including all business units and persons previously referred to), who are or, in or after 1998, were involved in any way with any of the following related to the alleged defect in the subject vehicles:

- a. Design, engineering, analysis, modification or production (e.g. quality control);
- b. Testing, assessment or evaluation;
- c. Consideration, or recognition of potential or actual defects, reporting, record-keeping and information management, (e.g., complaints, field reports, warranty information, part sales), analysis, claims, or lawsuits; or
- d. Communication to, from or intended for zone representatives, fleets, dealers, or other field locations, including but not limited to people who have the capacity to obtain information from dealers."

This response was compiled and prepared by this office upon review of the documents produced by various GM locations, and does not include documents generated or received at those GM locations subsequent to their searches.

Please contact me if you require further information about this response or the nature or scope of our searches.

Sincerely,



Gay P. Kent  
Director  
Product Investigations

Attachments

**N070067**  
**PE07-011**

**GM CONFIDENTIALITY LETTER**

**GM CONFIDENTIALITY LETTER  
HAS BEEN REMOVED FROM THIS  
ATTACHMENT AND SUPPLIED TO  
THE OFFICE OF THE CHIEF COUNSEL**

**N070067  
PE07-011**

**SUPPLIER CONFIDENTIAL LETTER**

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THE OFFICE OF THE CHIEF COUNSEL**



**N070067**  
**PE07-011**

**ATTACHMENT "1"**

**GM NON-CONFIDENTIAL MATERIAL**

**N070067  
PE07-011**

**ATTACHMENT "2"**

**GM CONFIDENTIAL MATERIAL**

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**N070067  
PE07-011**

**ATTACHMENT "3"**

**BOSCH CONFIDENTIAL MATERIAL**

**BOSCH CONFIDENTIAL MATERIAL  
HAS BEEN REMOVED FROM THIS  
ATTACHMENT AND SUPPLIED TO  
THE OFFICE OF THE CHIEF COUNSEL**

**N070067  
PE07-011**

**ATTACHMENT "4"**

**WEBSTER CONFIDENTIAL MATERIAL**

**WEBSTER CONFIDENTIAL MATERIAL  
HAS BEEN REMOVED FROM THIS  
ATTACHMENT AND SUPPLIED TO  
THE OFFICE OF THE CHIEF COUNSEL**