09V-203
(8 pages)

PIERCE MANUFACTURING, INC.
AN OSHKOSH CORPORATION COMPANY · ISO 9001 CERTIFIED

2600 AMERICAN DRIVE
POST OFFICE BOX 2017
APPLETON, WISCONSIN 54912-2017
920-832-3000 · FAX 920-832-3208

June 4, 2009

George Person (NVS-215)
Chief of Recall Management
National Highway Traffic Safety Administration
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington DC 20590

Vehicle Recall **09V-xxx Steering Angle Sensor**

Dear Mr. Person:

Pierce has been notified by Meritor WABCO Vehicle Control Systems of a potential safety defect in the steering angle sensor for Electronic Control Stability systems used on Pierce custom fire trucks. Pierce has decided that a defect which relates to motor vehicle safety exists in the motor vehicles listed below. We therefore furnish notification to the National Highway Traffic Safety Administration, in accordance with 49 CFR Part 573, Defect and Noncompliance Reports.

Manufacturer's Identification Code: 39-0139830

1. **Name of Manufacturer and Corporate contact:**

   Pierce Manufacturing Inc.
   Roger Lackore, Director of Research and Development
   Phone: 920 832-3249
   FAX: 920 832-3092
   E-Mail: rlackore@piercemfg.com

2. **Identification of Vehicle Classification:**

Make:	Pierce
Model Years Involved:	2008 – 2009
Models:	Arrow XT, Custom Contender, Quantum, Saber, and Velocity/Impel
Mfg. Date Beginning:	01/01/2008
Mfg. Date Ending:	05/31/2009

3. **Number of Potentially Affected Vehicles:** 176

4. **Estimated Percentage of Vehicles Containing the Defect or Noncompliance:**
   See Meritor WABCO Vehicle Control Systems Part 573 report 09E-032. For further information contact Ms. Anne Balkcom, Sr. Manager – Quality Assurance, Meritor WABCO.

5. **Description of the defect or noncompliance:**
   See Meritor WABCO Vehicle Control Systems Part 573 report 09E-032. For further information contact Ms. Anne Balkcom, Sr. Manager – Quality Assurance, Meritor WABCO.

6. **Chronology of Principal Events:**
   See Meritor WABCO Vehicle Control Systems Part 573 report 09E-032. For further information contact Ms. Anne Balkcom, Sr. Manager – Quality Assurance, Meritor WABCO.

7. **Corrective Action:**
   See Meritor WABCO Vehicle Control Systems Part 573 report 09E-032. For further information contact Ms. Anne Balkcom, Sr. Manager – Quality Assurance, Meritor WABCO.

8. **Representative Notices:** Notices will be sent at a later date.

Sincerely,
Pierce Manufacturing, Inc

Roger Lackore, P.E.
Director of Research and Development

MERITOR WABCO

Meritor WABCO Vehicle Control Systems
2135 West Maple Road
Troy, MI 48084-7121
Telephone 248.435.8001
Facsimile 248.435.8002
meritorwabco.com

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May 11, 2009

Daniel C. Smith, Esq.
Associate Administrator for Enforcement
National Highway Traffic Safety Administration Fax: 202-366-7882
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Re: Part 573 Defect Information Report relating to certain Electronic Stability Control Steering Angle Sensors shipped by Meritor WABCO Vehicle Control Systems between July 2007 and November 3, 2008

Meritor WABCO File: To Be Assigned NHTSA File: To Be Assigned

Dear Mr. Smith:

Meritor WABCO Vehicle Control Systems submits this Defect Information Report in accordance with the requirements of the National Motor Vehicle Safety Act of 1966 as set forth in 49 CFR 573.5. This document corresponds to the sub paragraphs of section 573.5 (c).

§573.6(c)(1) – This report is submitted by:

Meritor WABCO Vehicle Control Systems
2135 West Maple Road
Troy, Michigan 48084-7186

§573.6(c)(2) – Identification of vehicle or items of motor vehicle equipment:

This report covers the following Steering Angle Sensor (SAS) part numbers supplied by Meritor WABCO Vehicle Control Systems:

441 120 004 0	400 850 666 0
400 850 647 0	

These potentially suspect Steering Angle Sensors with serial numbers below 3000 were mainly shipped by Meritor WABCO to the steering column supplier. This supplier installed the SAS in the column and then shipped the completed assembly to a number of North American coach and specialty OEMs.

The Steer Angle Sensor is a component of the Meritor WABCO Electronic Stability Control System. The SAS provides the Electronic Stability Control (ESC) system with the driver

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selected steering angle, a critical input necessary to help detect loss of directional vehicle stability. When a loss of control event occurs, the ESC automatically applies individual foundation brakes on the vehicle to generate a counteractive force to help regain stability and mitigate the risk of a crash.

§573.6(c)(3) – Total number of vehicles or items of motor vehicle equipment affected:

Meritor WABCO estimates 664 Steering Angle Sensors were shipped between July 2007 and November 3, 2008 (serial numbers below 3000). A list of affected customer and quantities is contained in Appendix A of this notice.

§573.6(c)(4) – Percentage of vehicles or items of motor vehicle equipment affected:

Meritor WABCO has determined that 100% of the above mentioned population contains the original SAS design that potentially could perform as described in the following paragraph.

§§573.6(c)(5) – Description of the defect:

Meritor WABCO recently received reports from six motor coaches and two fire trucks equipped with Meritor WABCO Electronic Stability Control (ESC) alleging unexpected brake activations during low speed turning maneuvers. Meritor WABCO's investigation revealed the rotor driving tab of the Steer Angle Sensor used in the ESC system was sheared off on three of the coaches and two of the fire trucks. All of the affected Steer Angle Sensors were the original design with serial numbers below 3000. There have been no crashes or injuries relating to this sensor issue to date.

The Steer Angle Sensor driving tab fits in a groove in the steering column shaft, causing the sensor rotor to turn with the steering wheel. The SAS provides the Electronic Stability Control system with the driver selected steering angle, a critical input necessary to detect loss of directional stability. With a broken SAS driving tab, the ESC yaw rate sensor and lateral accelerometer will measure a difference in vehicle direction when the driver makes a turn without a corresponding change in steer angle. This could be interpreted by the ESC as a directional instability, requiring intervention by brake activation of a selected wheel.

Diagnostics that are integrated in the ESC software may or may not detect a broken SAS driving tab after a period of time during the ignition cycle once a failure has occurred. On subsequent ignition cycles, ESC power-up diagnostics will likely prevent the ESC from initializing with a broken SAS driving tab, eliminating the possibility of erroneous low speed brake activations.

Meritor WABCO's investigation indicates that internal SAS friction can develop between the sensor gears and sensor housing as a result of external forces experienced on the vehicle including vibration. If the developed friction is great enough, the driving tab can shear as the driver turns the steering wheel. Laboratory test data indicates incorporation of grease on SAS components during assembly significantly reduces the likelihood of internal frictional increases resulting in adequate SAS durability when properly installed in the steering column.

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§§573.6(c)(6) – Chronology of principal events:

- November 3, 2008 – Last shipment of original sensor design from Meritor WABCO (serial numbers below 3000).
- November 7, 2008 – First shipment of improved sensor design which included grease lubrication on internal components (serial number above 3000).
- March 16, 2009 – Motor Coach Industries (MCI) reports to Meritor WABCO that a driver experienced unexpected stability control activations while performing tire testing at a test track in low speed figure eight maneuvers and while driving straight after completion of the maneuver. Upon cycling the ignition the behavior could not be reproduced.
- March 16 - 25, 2009 – MCI receives several reports of similar behavior on other coaches and attempts to capture data during an event for Meritor WABCO review. All attempts to duplicate the event were unsuccessful.
- March 27 – April 8, 2009 – MCI provides a suspect coach to Meritor WABCO for evaluation. Results indicated the Steer Angle Sensor (SAS) drive tab was completely sheared off and the subsequent lack of driver selected steer angle resulted in erroneous brake activation during the ignition cycle where the failure occurred.
- April 2, 2009 – Meritor WABCO checks inventory and determines zero stock of any affected SAS part numbers.
- April 9, 2009 – Meritor WABCO call-in service center receives report of unexpected ESC activations on a Pierce fire truck. Call-in center advises technician to inspect condition of SAS and the driving tab is found to be sheared off.
- April 20, 2009 – Measurements of a steering column installed with a SAS containing a sheared drive indicate critical dimensions are within specifications.
- May 7, 2009 – Meritor WABCO management reviews the information and decides to campaign affected Steer Angle Sensors shipped prior to November 3, 2008.

§573.6(c)(7) – Test results or data supporting non-compliance:

Not applicable.

§573.6(c)(8) – Description of remedy:

The identified defect will be remedied by notifying buyers of vehicles built with the affected product and requesting that they take the vehicles to certified dealers capable of inspecting the Steer Angle Sensors' serial numbers and replacing suspect Steer Angle Sensors, having a serial number below 3000, with the most recent SAS design level provided by Meritor WABCO. On vehicles requiring Steer Angle Sensor replacement, an ESC calibration procedure will have to be conducted prior to the vehicle returning to service.

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The following is an approximate time schedule for the program:

By May 25, 2009:	Meritor WABCO notification to affected customers
By June 1, 2009:	Complete service instructions and procure inventory for replacement Steer Angle Sensors
By June 1, 2009:	OEMs begin notifying customers and initiate the sensor replacement action where necessary

Information Requested under §573.6(c)(9)

We trust that the information provided in this document is fully responsive to the requirements of 49 CFR §573.5. All additions or modifications to any of the information given will be reported promptly to NHTSA. Any questions with respect to the information provided should be directed to the undersigned.

Respectfully Submitted,

Anne Balkcom
Sr. Mgr. - Quality Assurance
Meritor WABCO Vehicle Control Systems
845 Lindbergh Court
Hebron, KY 41048
Ph 859.525.3676 Cell 859.380.7516
Anne.Balkcom@MeritorWabco.com

Enclosures:

Appendix A: Summary of Affected Customers and Quantities Shipped
Appendix B: Illustration of Steer Angle Sensor

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Appendix A:
List of Affected Customers and Quantities Shipped

OEM	Quantity
BAE Systems TVS LP 5000 I-10 WEST SEALY, Texas 77474	9
Douglas Autotech Corp 300 Albers Rd Bronson, Mich. 49028	592
Emergency – One 3611 S.W. 20TH Street Ocala, FL 34474	14
Spartan Motors, Inc. 1165 Reynolds Road Charlotte, Mich. 48813	6
Pierce Manufacturing 2600 American Drive P.O. Box 2017 Appleton, WI 54912	18
Motor Coach Industries (MCI) 1475 Clarence Avenue; Door 10, NPD Winnipeg, Manitoba R3T 1T5, Canada	24 + 1 service part

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Appendix B: Illustration of Steer Angle Sensor