Saving lives
through research
and education

Telematics, Safety Defects, and Connected Vehicles

March 2016

AAA Foundation for Traffic Safety

607 14th Street, NW, Suite 201 | Washington, DC 20005 | AAAFoundation.org | 202-638-5944

Title

Telematics, Safety Defects, and Connected Vehicles. *(March 2016)*

Authors

Suzanne Murtha, Jeffrey Bagdade, Michael Freitas, and John Hinch

Atkins North America Inc.

About the Sponsor

AAA Foundation for Traffic Safety
607 14th Street, NW, Suite 201
Washington, DC 20005
202-638-5944
www.aaafoundation.org

Founded in 1947, the AAA Foundation in Washington, D.C. is a not-for-profit, publicly supported charitable research and education organization dedicated to saving lives by preventing traffic crashes and reducing injuries when crashes occur. Funding for this report was provided by voluntary contributions from AAA/CAA and their affiliated motor clubs, from individual members, from AAA-affiliated insurance companies, as well as from other organizations or sources.

Executive Summary

The AAA Foundation for Traffic Safety undertook an effort to investigate the possibilities of integrating data from forthcoming connected vehicle systems into defect analysis for the National Highway Traffic Safety Administration (NHTSA). Atkins was selected by the AAA Foundation to study NHTSA's defect investigation process and challenges. Upon detailed investigation of available telematics data, understanding of NHTSA defect analysis and processes, and finally availability of data from the forthcoming connected vehicle mandate, our analysis concluded that it does not seem feasible that in the existing technical environment that connected vehicle data could efficiently be used to help improve and analyze defects in the near term. However, this area is extremely promising and the technology is advancing rapidly. Generally, we learned that the NHTSA defect identification and analysis program is currently significantly limited in terms of staffing and funding. Further, at the behest of the Office of Defects Investigation (ODI), NHTSA is currently undergoing changes in processes and is also considering integration of large data aggregation techniques to be enabled to better identify defects before they become large scale. Atkins' report on the ODI process came at roughly the same time as the US Investigator General's (IG) report on ODI which included a number of suggested process improvements. Atkins and the AAA Foundation met with NHTSA to talk through capabilities and needs of both organizations to see where there is a possibility of AAA supporting NHTSA in completing some of the IG recommended steps as well as helping improve data gathering from the field.

Introduction

The recent flurry of defect investigations, including those involving GM, has highlighted some apparent weaknesses in the current process used by NHTSA to identify and investigate potential safety related defects. Utilizing reports from manufacturers and consumers, along with crash reports, the analyses of this data is typically an extremely complicated and challenging exercise. Accordingly, NHTSA and others are interested in ways in which this process could be made more efficient or effective.

At the same time, car manufacturers are installing myriad sensors in vehicles to, among other purposes, enhance vehicle operations, diagnostic and maintenance related activities, and various connected car capabilities. This raises an obvious question: "Can these sensors and the data they generate support the identification of safety related defects from the field?" This report investigates the possibilities of using such technologies in that fashion.

NHTSA Data – What Exists Now

There are currently two main sources of data for the NHTSA recall process: 1) public input and 2) the OEM monthly and quarterly data required by TREAD Act.
There are currently significant problems with both of these sources of data, as described in detail in the recent Office of Inspector General (OIG) report of June, 2015 (OIG, 2015). Below is a summary of these problems and benefits as gathered from the OIG report and also from primary interviews with NHTSA staff.

Primary Data from the Public:

- Problems
    - General inaccuracy – people reporting data are not automotive repair experts, engineers or story tellers. Reporting problems with vehicles is not their area of expertise, so there are a wide range of inaccuracies through which NHTSA must sort.
    - Lack of understanding about specific components – The general public does not understand exactly which parts of the vehicle might be causing a problem. Someone who is reporting might not understand exactly which part does what function and may also misname the components.
    - Lack of understanding of actual problem as compared to reporting of symptoms – NHTSA has found instances where the OEM has reported the symptoms of a defect in order to deflect the focus on the actual cause of the problem
    - Lack of reports – not many people understand that they can report a defect, and fewer understand how to do that. Therefore, there are not many reports.
- Benefits
    - NHTSA prefers these narrative reports to OEM data. Staffers prefer a narration as opposed to data; they feel like they can get a better sense of the intensity of a problem from the narration versus the pure data.
    - Narratives lead NHTSA to a more detailed understanding of the problem as a whole. Also sorting through these narratives is a time consuming undertaking.

Data from OEMs:

- Problems
    - Non standardized reporting – all OEMs report minimum data requirements, many report additional data which makes the general pool of data challenging to sort

- Obfuscated data – frequently the OEMs change the description of the problem to offset the focus on the actual problem. For example, the report might be a related component rather than the actual component causing the problem.

- The Office of Defect Investigation (ODI) lacks the capability set to adequately characterize the data.

    - The OIG report details, at great length the inadequacies of the ODI, both from a staffing and training perspective.

    - The ODI also lacks the toolset to adequately mine the data it receives

    - Data is typically two to three months behind in analysis, due to both the reporting cycle requirements and ODI's ability to analyze the data.

    - ODI has a new tool for data analysis from IBM but has not yet entirely integrated the tool.

- In the OIG report, NHTSA agrees to a schedule of implementing the OIG suggested improvements.

- There are significantly more systems and subsystems in a vehicle than NHTSA has the categories to report.

- <u>Benefits</u>

    - Large quantity of usable data

    - Generally delivered on a regular basis

Currently, this data, while accessible to the general user is extremely difficult to query. The OEM reports are available through the safercar.gov in a flat file format as Acrobat files. These are downloadable, but generally not accessible or easily convertible into usable Excel or Access files.

We see from the OIG reports that changes have been recommended in data formats, but not yet in formats releasable for external analysis. Atkins also understands that the format available to the public is also highly influenced by the OEMs. If possible, it would be most useful if data available through Safercar.gov were in a usable format such as Excel or Access rather than Acrobat files.

Atkins' perspective that NHTSA's sharable data is unusable for external analysis was confirmed from meetings with AAA Automotive Engineering representation. The AAA technical team also agrees that the data in its current form is unusable to any external groups attempting analysis. Changes in the output can technically be done, the pushback will be from the automotive manufacturers which are less than willing to share their data publically.

Data That OEMs Gather Telematically or Have Available for Download

AAA Automotive Engineering and repair has a detailed database of all of the data, PIDs and error codes for all of the 2015 Ford Fusion, Toyota Camry and Chevrolet Malibu. The data from these vehicles are somewhat representative of data from the field in general, in that the fields and data types have large variations across message type and amounts of messages available. Only considering PIDs, for example, the Camry has around 3300 specific PIDs, Malibu has around 1,500 and the Fusion has about 1,190. This variation is indicative of the variations NHTSA faces with regard to available data for investigations. From the tables listed below, we see the variation in code types by model ad manufacturer. The breakdown by model and code category shows variation all across all types codes as well as models. Clearly some standardization of these codes could help simplify data analysis as well as capability to use the data to impact defect analysis.

Table 1 - Trouble Code Listing By Vehicle

DTC

Row Labels	Count of Category
2014 Chevrolet Malibu	**4975**
Network	616
Powertrain	3916
Safety	442
Security	1
2015 Ford Fusion	**12575**
Body	2620
Chassis	482
Engine	5480
Network	1185
Safety	1356
Security	313
Transmission	1139
2015 Toyota Camry	**4107**
Body	439
Chassis	190
Engine	2078
Network	186
Safety	805
Security	39
Transmission	370
Grand Total	**21657**

Table 2 - CAN Listing by Vehicle

CAN

Row Labels	Count of Category
2014 Chevrolet Malibu	**253**
Body	76
Chassis	16
Powertrain	86
Safety	72
Security	3
2015 Ford Fusion	**675**
Body	269
Chassis	42
Powertrain	199
Safety	133
Security	32
2015 Toyota Camry	**305**
Body	110
Chassis	29
Powertrain	92
Safety	49
Security	25
Grand Total	**1233**

Table 3 - PID Code Listing by Vehicle

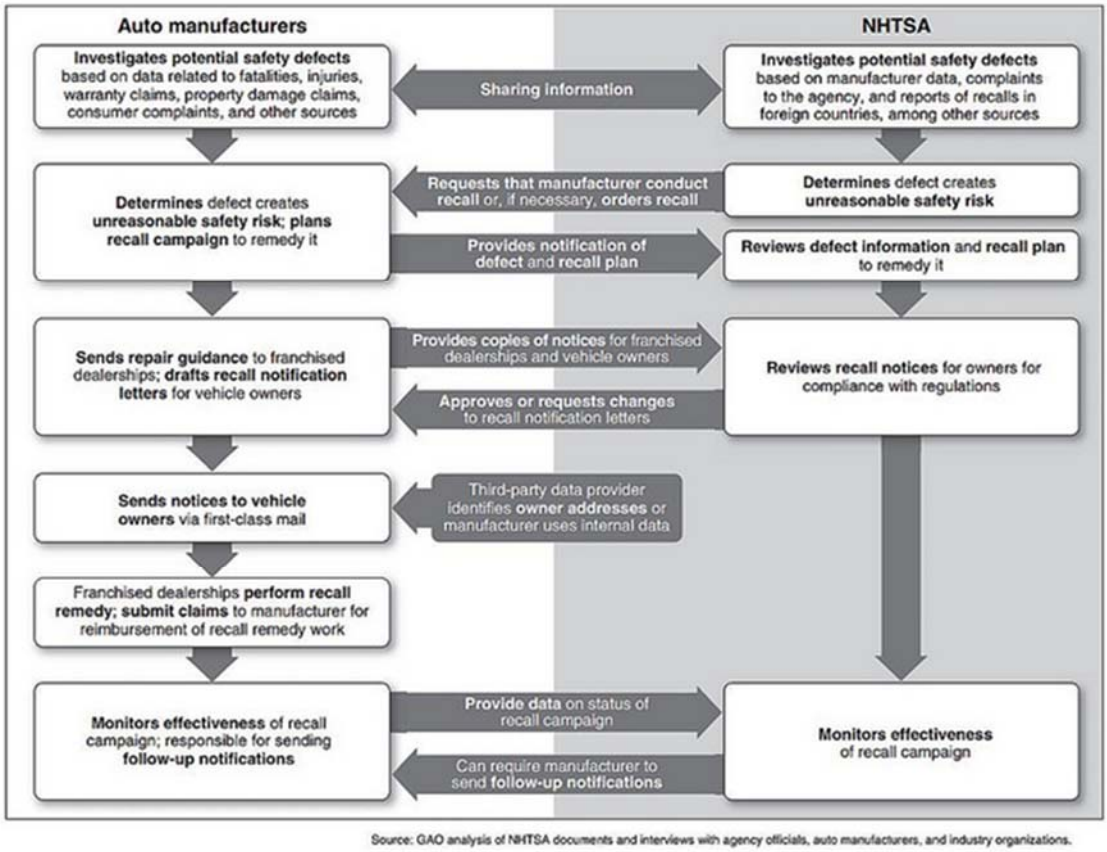
PID

Row Labels	Count of Category
2014 Chevrolet Malibu	**1516**
Body	544
Powertrain	667
Safety	258
Security	47
2015 Ford Fusion	**1516**
Body	544
Powertrain	667
Safety	258
Security	47
2015 Toyota Camry	**3279**
Body	1001

Powertrain	977
Safety	914
Security	250
Chassis	137
Grand Total	**6311**

Potential Changes to NHTSA Data

Atkins detailed NHTSA's recall process, featured in Appendix 2. We described the process flows, what impacts various aspects of recall and also below we describe the anticipated forthcoming changes to the recall process. An overview of that process is included below here. This graphic is from a 2011 GAO report.



Source: GAO analysis of NHTSA documents and interviews with agency officials, auto manufacturers, and industry organizations.

Below Atkins lists the changes in processes and data that OIG has recommended to NHTSA as well as the deadlines NHTSA has set for themselves to comply. All of these recommendations will help NHTSA improve the ability to analyze potential defects. Only changes to publically available data will help external stakeholders analyze and use data.

NHTSA's Estimated Completion Date	OIG Recommendation Number(s)
September 30, 2015	6
October 30, 2015	13, 15
November 30, 2015	17
January 31, 2016	3*, 10
April 30, 2016	2, 5
May, 30, 2016	1*, 11, 14

June 30, 2016 4, 7, 8, 9, 12, 16

To improve ODI's collection of vehicle safety data, OIG recommended the National Highway Traffic Safety Administrator take the following actions:

1. Develop and implement a method for assessing and improving the quality of early warning reporting data.

2. Issue guidance or best practices on the format and information that should be included in non-dealer field reports to improve consistency and usefulness.

3. Require manufacturers to develop and adhere to procedures for complying with early warning reporting requirements; and require ODI to review these procedures periodically.

4. Expand current data verification processes to assess manufacturers' compliance with regulations to submit complete and accurate early warning reporting data. At minimum, this process should assess how manufacturers assign vehicle codes to specific incidents and how they determine which incidents are reportable.

5. Develop and implement internal guidance that identifies when and how to use oversight tools to enforce manufacturers' compliance with early warning reporting data requirements.

6. Provide detailed and specific guidance to consumers on the information they should include in their complaints, as well as the records they should retain (such as police reports and photographs) in the event that ODI contacts them for more information.

To improve ODI's processes for screening and analyzing vehicle safety data, we recommend the National Highway Traffic Safety Administrator take the following actions:

7. Develop an approach that will determine which early warning reporting test scores provide statistically significant indications of potential safety defects.

8. Periodically assess the performance of the early warning reporting data tests using out-of-sample testing.

9. Institute periodic external expert reviews of the statistical tests used to analyze early warning reporting data to ensure that these methods are up-to-date and in keeping with best practices.

10. Implement a supervisory review process to ensure that all early warning reporting data are analyzed according to ODI policies and procedures.

11. Develop and implement a quality control process to help ensure complaints are reviewed thoroughly and within a specified timeframe.

12. Update standardized procedures for identifying, researching, and documenting safety defect trends that consider additional sources of information beyond consumer complaints, such as special crash investigation reports and early warning data.

13. Document supervisory review throughout the pre-investigative process including data screening.

14. Evaluate the training needed by pre-investigative staff to identify safety defect trends; and develop and implement a plan for meeting identified needs.

To promote a streamlined process for opening investigations of potential safety concerns, we recommend the National Highway Traffic Safety Administrator take the following actions:

15. Develop and implement guidance on the amount and type of information needed to determine whether a potential safety defect warrants an investigation proposal and investigation.

16. Develop a process for prioritizing, assigning responsibility, and establishing periodic reviews of potential safety defects that ODI determines should be monitored.

17. Document and establish procedures for enforcing timeframes for deciding whether to open investigations; and establish a process for documenting justifications for these decisions.

Atkins has also learned from its own investigation that NHTSA may be considering making the publically available data more usable, possibly making the data available in in a usable format.

Appendix 1 - Methods

In July 2015, AAA Foundation, Atkins, and NHTSA met to discuss areas of potential mutual interest. In attendance were:

NHTSA
Fran Borris, Associate Administrator, Enforcement
William Godfrey, NHTSA
Greg Mango, Chief, Defects Assessment, ODI
Bill Collins (phone), ODI Investigator from VRTC in East Liberty, OH
Jennifer Timian, Division Chief for Recall Management
Otto Matheke, Office of Chief Counsel
Elizabeth Mykytiuk, Office of the Chief Counsel
Suzanne Murtha, Atkins
J. Peter Kissinger, AAA Foundation for Traffic Safety

Atkins scheduled a July meeting with NHTSA to discuss the possibilities of helping provide defect data to NHTSA. In advance of the meeting, Atkins looked into the feasibility of additions that AAA members can contribute to the data solution. Atkins suggested that in the short term, AAA could provide an app for members that directly syncs with the NHTSA public reporting system. AAA could put out the app upgrade as a response to the OIG investigation and suggest that AAA is helping NHTSA resolve the problem with the lack of detailed narration. AAA could build a menu system that allows the user to more specifically describe their experience and maybe even upload photos.

Longer term, it seems that there is a possibility that connected vehicle data could be could be transmitted directly from the vehicle to a centralized repository for NHTSA. Updated, objective, regular data would solve much of the data-related issues that NHTSA is facing. It would also relieve the staff related issues discovered by OIG, as the data would be standardized and more easily analyzed.

Appendix 2 – NHTSA Recall Process

Diagram of NHTSA Recall Process

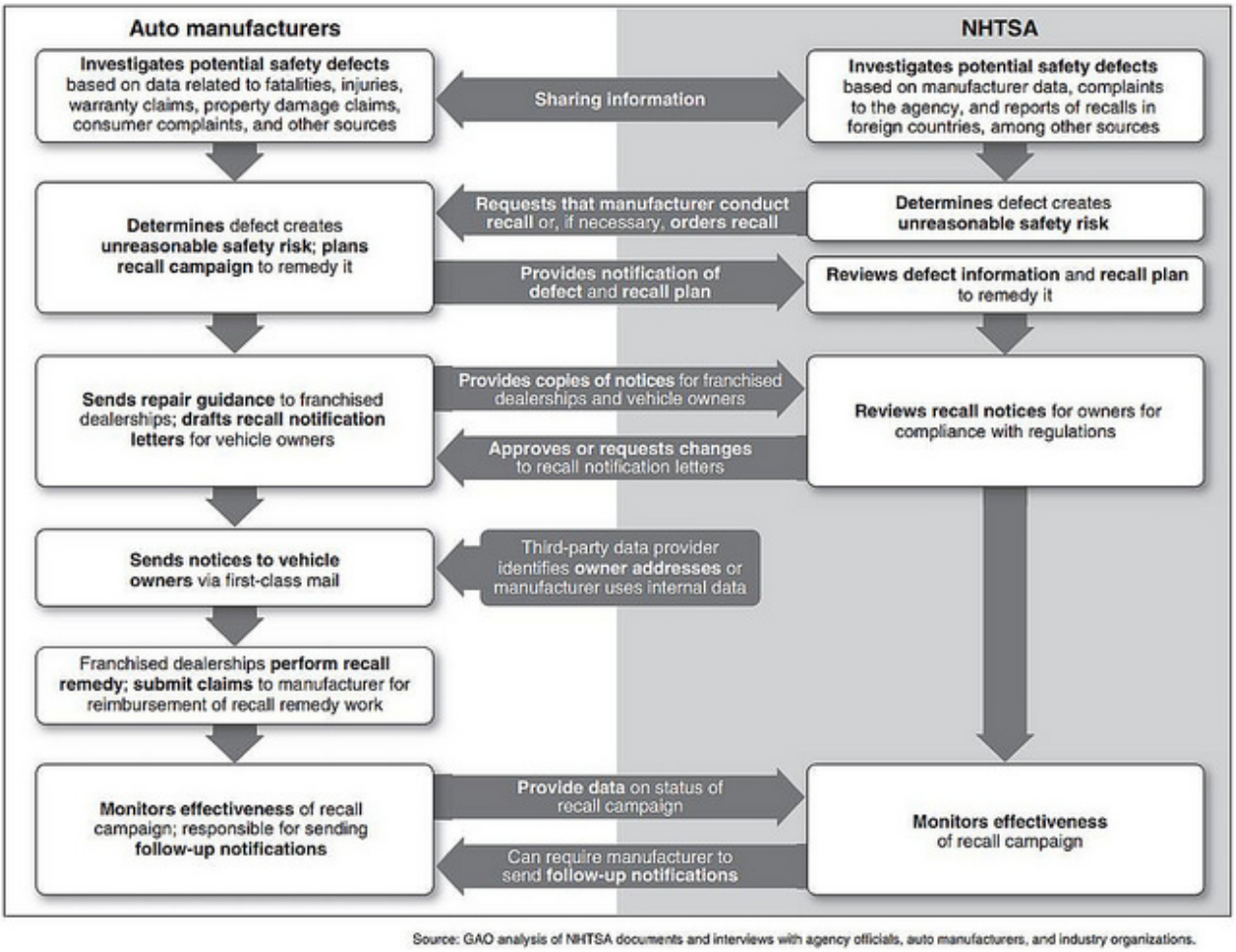


Figure 9.1 - GAO Process Flow for Defect Analysis (2011)

The recall process is defined by The National Traffic and Motor Vehicle Safety Act (originally enacted in 1966 and now re-codified as 49 U.S.C. Chapter 301). These regulations define the process for recalls.

NHTSA operates under the authority stated in the US Code. Based on this authority, NHTSA promulgates standards through the rulemaking process. These regulations are found in the code of federal regulations, specifically CFR 49. The Office of Defect Investigation (ODI) uses several parts of CFR49, such as

- PART 554—STANDARDS ENFORCEMENT AND DEFECTS INVESTIGATION

- PART 552—PETITIONS FOR RULEMAKING, DEFECT, AND NONCOMPLIANCE ORDERS
- PART 573—DEFECT AND NONCOMPLIANCE RESPONSIBILITY AND REPORTS
- PART 577—DEFECT AND NONCOMPLIANCE NOTIFICATION

The United States Code for Motor Vehicle Safety (Title 49, Chapter 301) defines motor vehicle safety as "the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident, and includes nonoperational safety of a motor vehicle." A defect includes "any defect in performance, construction, a component, or material of a motor vehicle or motor vehicle equipment." Generally, a safety defect is defined as a problem that exists in a motor vehicle or item of motor vehicle equipment that:

- Poses a risk to motor vehicle safety, and
- May exist in a group of vehicles of the same design or manufacture, or items of equipment of the same type and manufacture.

NHTSA investigative Process

NHTSA's website describes that its technical experts review every call, letter, and online report of an alleged safety problem filed and uses non-safety related reports as a potential indicator of safety related problems, over which it does have jurisdiction.

Incoming information is generally from two main sources, consumers and OEMs. There are other smaller, but important sources, such as petitions from advocate groups, and this is another possible place for AAA to have a role.

Once a package has been developed, it is transferred to the investigate staff, which is made up of three divisions. Two focused on light vehicles and another on heavy vehicles. The staff have two major investigative tools, Pes and EAs, the PE, preliminary investigation, is generally the starting point for formal discussions with the OEM, typically a letter is written to obtain information the OEM have related to the topic. If after 4 months, the agency believes more action is needed and the OEM has not recalled the defect, the agency elevates the investigation to an EA, engineering analysis. More letter are written for more detailed data, often testing is conducted. This stage can proceed for over a year, typically ending is a recall action by the OEM.

Recall management is done by a different group, and they manage ODIs recalls as well as OVSC's recalls. They keep the official records, and perform an important role to monitor recall completion rates, and if too low, the agency takes further action.

The agency's Office of Defects Investigation investigative process consists of four parts:

- Screening
- Analysis
- Investigation
- Management

Screening

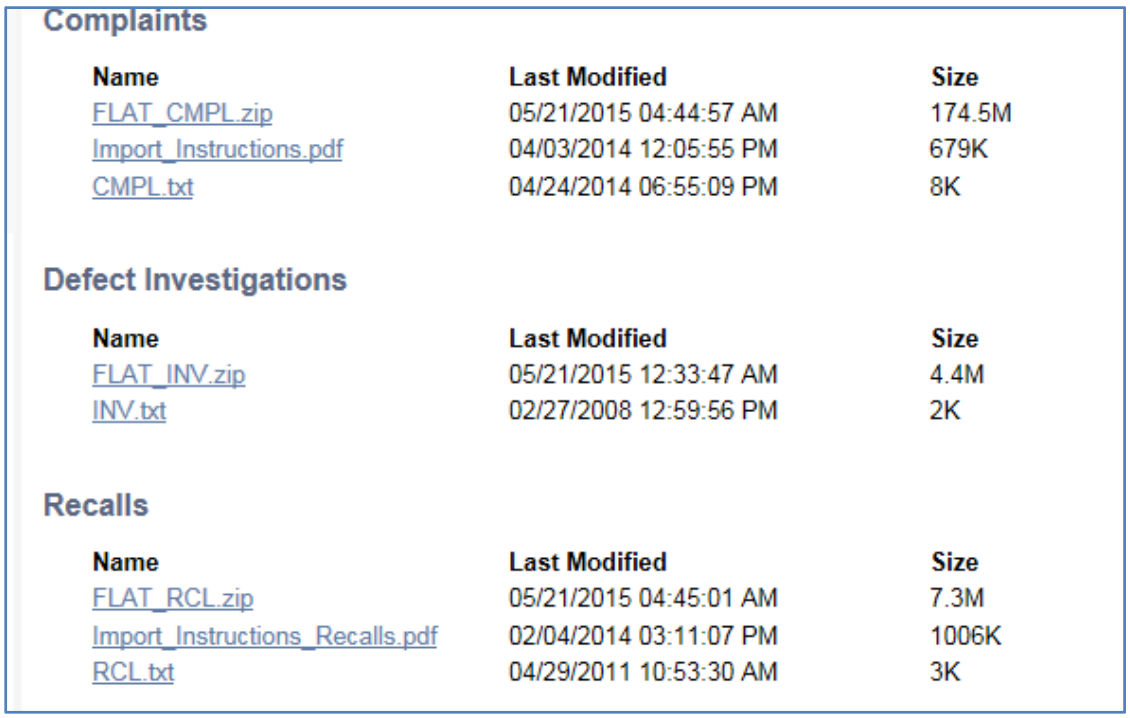
NHTSA regularly preliminary screens consumer complaints and other information related to alleged defects to decide whether to open an investigation. NHTSA has roughly 50 technical staff members and several contractors who in 2014 annually screened over 77,000 reports, which was up from 50,000 in 2013. The screening office spends the bulk of its time on two main programs:

1) Reading consumer information, called VOQ, vehicle owner questionnaire, which are mostly electronic.
2) Analyzing TREAD data, which is a substantial effort. Over the past several years, improvements have been made to this program.

Screening also looks are technical service bulletins (TSBs) to see if there is a safety issue with the action taken by the OEM. Once the screening staff finds a trend, they develop an initial evaluation (IE), which is a package with supporting information providing the justification for opening an investigation. Sources of recall data include:

Automotive manufacturers – the OEMS send monthly reports to NHTSA which include any vehicle related injuries in the US and vehicle related fatalities globally.

Safercar.gov – NHTSA maintains a website called safercar.gov. The site enables users to look up recalls and view other safety data including safety articles, recall notices and information for vehicle owners standard reporting and labeling tools for OEMs. Additionally, all of the standardized reported OEM data is available. However, the data in in flat text files, which makes the data challenging to manipulate. Below is a screenshot from the available flat file choices:



Complaints

Name	Last Modified	Size
FLAT_CMPL.zip	05/21/2015 04:44:57 AM	174.5M
Import_Instructions.pdf	04/03/2014 12:05:55 PM	679K
CMPL.txt	04/24/2014 06:55:09 PM	8K

Defect Investigations

Name	Last Modified	Size
FLAT_INV.zip	05/21/2015 12:33:47 AM	4.4M
INV.txt	02/27/2008 12:59:56 PM	2K

Recalls

Name	Last Modified	Size
FLAT_RCL.zip	05/21/2015 04:45:01 AM	7.3M
Import_Instructions_Recalls.pdf	02/04/2014 03:11:07 PM	1006K
RCL.txt	04/29/2011 10:53:30 AM	3K

Figure 2 - Safercar.gov Screenshot of Available OEM data files

Interviews for this project revealed that there are programs available to convert the flat files into useable data formats, but doing the conversion is not a simple, or seemingly common, undertaking. Below is a screen shot of the publically available data on safercar.gov.

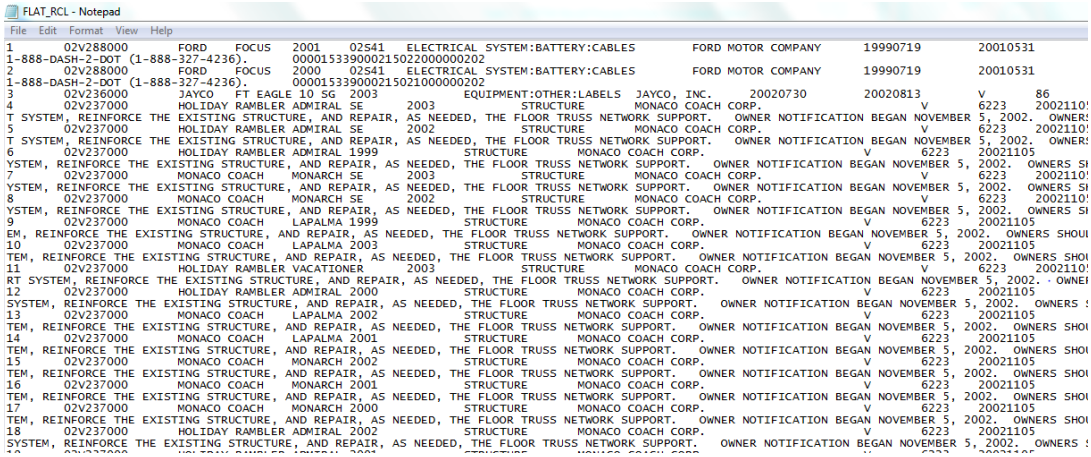


Figure 3 - Screenshot of Flatfiles Available on Safercar.gov

TREAD Act (TREAD Act featured later in this Appendix) – In the wake of the 2000 Firestone tire recall, the TREAD Act was passed. The TREAD Act requires automotive manufacturers to produce the data listed above as well as:

- Production data – which vehicles were produced when and where as of last month

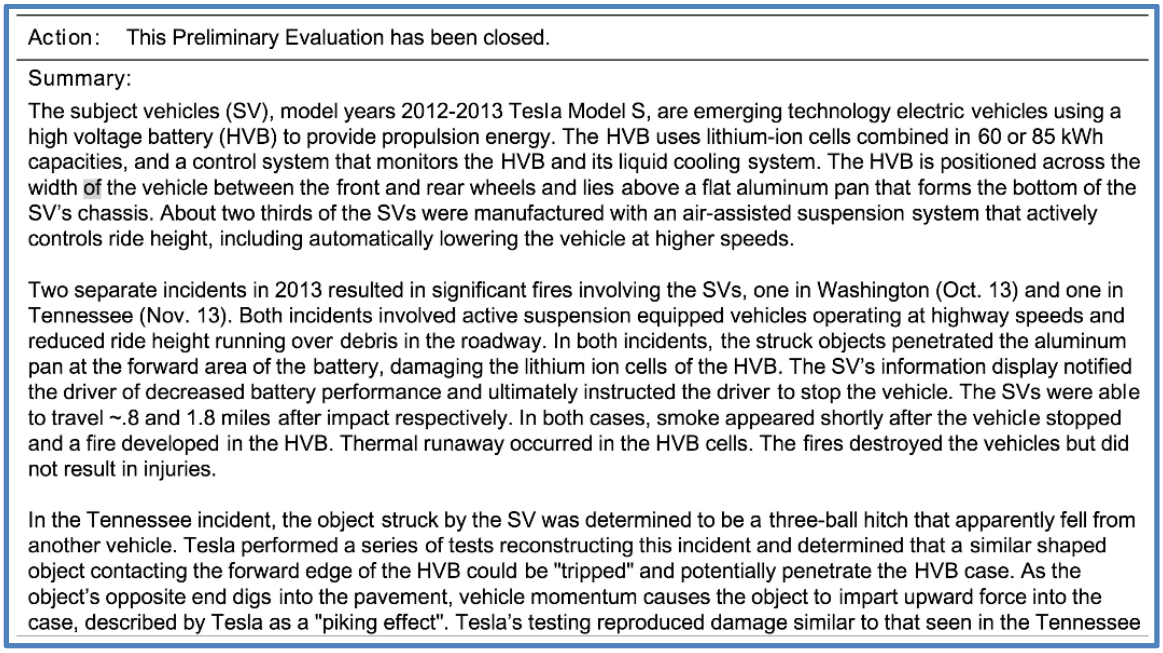
- Aggregated counts of problems – there are roughly 20 categories of components including lane departure warning, suspension systems and forward crash avoidance systems, for each of which, OEMs file monthly aggregated reports of issues.

Early warning data is usually reported by OEMs within two months, sometimes as late as five months.

Members of the public reporting defects through the website and other mechanisms. Roughly 10% of these claims require further investigation. NHTSA aims to respond to complaints within one business day.

Analysis

NHTSA executes an analysis of any petitions calling for defect investigations and/or reviews of safety-related recalls. The NHTSA team does an in-depth analysis of not only fatality reports, but also other types or groups of reports which may indicated potential larger problems.



Action: This Preliminary Evaluation has been closed.

Summary:

The subject vehicles (SV), model years 2012-2013 Tesla Model S, are emerging technology electric vehicles using a high voltage battery (HVB) to provide propulsion energy. The HVB uses lithium-ion cells combined in 60 or 85 kWh capacities, and a control system that monitors the HVB and its liquid cooling system. The HVB is positioned across the width of the vehicle between the front and rear wheels and lies above a flat aluminum pan that forms the bottom of the SV's chassis. About two thirds of the SVs were manufactured with an air-assisted suspension system that actively controls ride height, including automatically lowering the vehicle at higher speeds.

Two separate incidents in 2013 resulted in significant fires involving the SVs, one in Washington (Oct. 13) and one in Tennessee (Nov. 13). Both incidents involved active suspension equipped vehicles operating at highway speeds and reduced ride height running over debris in the roadway. In both incidents, the struck objects penetrated the aluminum pan at the forward area of the battery, damaging the lithium ion cells of the HVB. The SV's information display notified the driver of decreased battery performance and ultimately instructed the driver to stop the vehicle. The SVs were able to travel ~.8 and 1.8 miles after impact respectively. In both cases, smoke appeared shortly after the vehicle stopped and a fire developed in the HVB. Thermal runaway occurred in the HVB cells. The fires destroyed the vehicles but did not result in injuries.

In the Tennessee incident, the object struck by the SV was determined to be a three-ball hitch that apparently fell from another vehicle. Tesla performed a series of tests reconstructing this incident and determined that a similar shaped object contacting the forward edge of the HVB could be "tripped" and potentially penetrate the HVB case. As the object's opposite end digs into the pavement, vehicle momentum causes the object to impart upward force into the case, described by Tesla as a "piking effect". Tesla's testing reproduced damage similar to that seen in the Tennessee

Figure 4 - Example of a Closed Preliminary Evaluation

Investigation

Where warranted, NHTSA does an investigation of alleged safety defects. The investigation involves, including data analysis, multiple interactions with automotive manufacturers. More recent reforms of the recall investigation process all less back and

forth discussion with the OEMs than has happened in the past. However, discussions with OEMs about a group of defects have also influenced postponements or stoppages in defect investigations.

Below are two "resumes." In the investigation process, the resume is generated to provide a brief summary of the investigation; counts of vehicles, injuries, and deaths alledged to be associated with the defect; and proposed action. It has a place for the investigtor, division chief and office director to sign.

U.S. Department of Transportation
National Highway Traffic Safety Administration

ODI RESUME

Investigation: PE 12-009
Date Opened: 03/28/2012
Investigator: Derek Rinehardt
Reviewer: Jeff Quandt
Approver: Frank Borris
Subject: Engine Compartment Fire

MANUFACTURER & PRODUCT INFORMATION

Manufacturer:	CHRYSLER GROUP LLC
Products:	MY 2010 Jeep Wrangler
Population:	100,000 (Estimated)
Problem Description:	Consumer allegations of fires originating in the engine compartment.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	8	TBD	TBD
Crashes/Fires:	8	TBD	TBD
Injury Incidents:	0	TBD	TBD
Fatality Incidents:	0	TBD	TBD
Other*:	0	TBD	TBD

*Description of Other:

ACTION / SUMMARY INFORMATION

Action: A Preliminary Evaluation has been opened.

Summary:

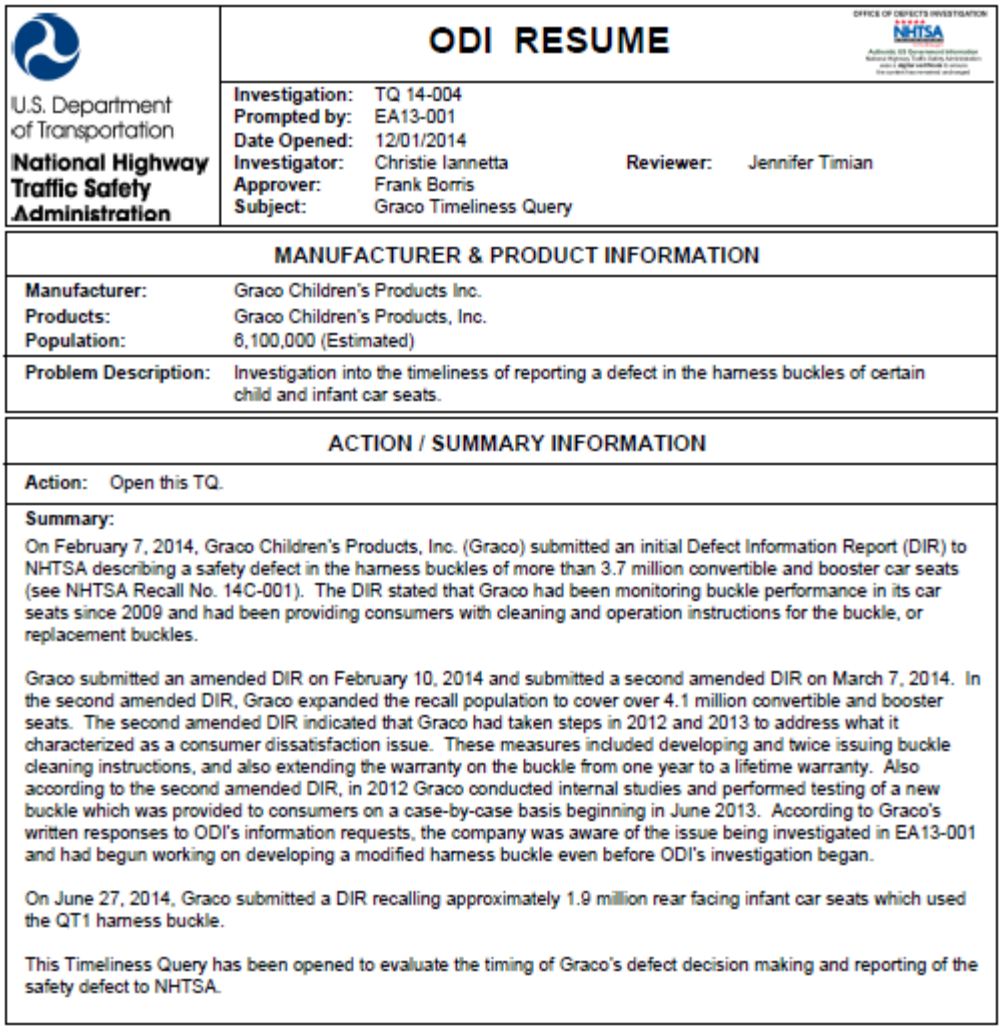
The Office of Defects Investigation has received eight reports alleging fires originating in the engine compartment of MY 2010 Jeep Wrangler vehicles. Seven of the 8 complainants allege the fire or symptoms of the impending fire began while driving.

A Preliminary Evaluation has been opened to assess the scope, frequency, and safety-related consequences of the alleged defect.

The ODI complaints cited above can be viewed at www-odi.nhtsa.dot.gov/complaints under the following ODI identification numbers: 10358879, 10441570, 10371836, 10421483, 10423198, 10427833, 10429042, 10451570

Figure 5 - OEM "Resume"

NHTSA generates resumes for most of the actions. Here is a recent one that was generated for a timely issue.



U.S. Department of Transportation
National Highway Traffic Safety Administration

ODI RESUME

OFFICE OF DEFECTS INVESTIGATION
NHTSA

Investigation: TQ 14-004
Prompted by: EA13-001
Date Opened: 12/01/2014
Investigator: Christie Iannetta **Reviewer:** Jennifer Timian
Approver: Frank Borris
Subject: Graco Timeliness Query

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Graco Children's Products Inc.
Products: Graco Children's Products, Inc.
Population: 6,100,000 (Estimated)

Problem Description: Investigation into the timeliness of reporting a defect in the harness buckles of certain child and infant car seats.

ACTION / SUMMARY INFORMATION

Action: Open this TQ.

Summary:

On February 7, 2014, Graco Children's Products, Inc. (Graco) submitted an initial Defect Information Report (DIR) to NHTSA describing a safety defect in the harness buckles of more than 3.7 million convertible and booster car seats (see NHTSA Recall No. 14C-001). The DIR stated that Graco had been monitoring buckle performance in its car seats since 2009 and had been providing consumers with cleaning and operation instructions for the buckle, or replacement buckles.

Graco submitted an amended DIR on February 10, 2014 and submitted a second amended DIR on March 7, 2014. In the second amended DIR, Graco expanded the recall population to cover over 4.1 million convertible and booster seats. The second amended DIR indicated that Graco had taken steps in 2012 and 2013 to address what it characterized as a consumer dissatisfaction issue. These measures included developing and twice issuing buckle cleaning instructions, and also extending the warranty on the buckle from one year to a lifetime warranty. Also according to the second amended DIR, in 2012 Graco conducted internal studies and performed testing of a new buckle which was provided to consumers on a case-by-case basis beginning in June 2013. According to Graco's written responses to ODI's information requests, the company was aware of the issue being investigated in EA13-001 and had begun working on developing a modified harness buckle even before ODI's investigation began.

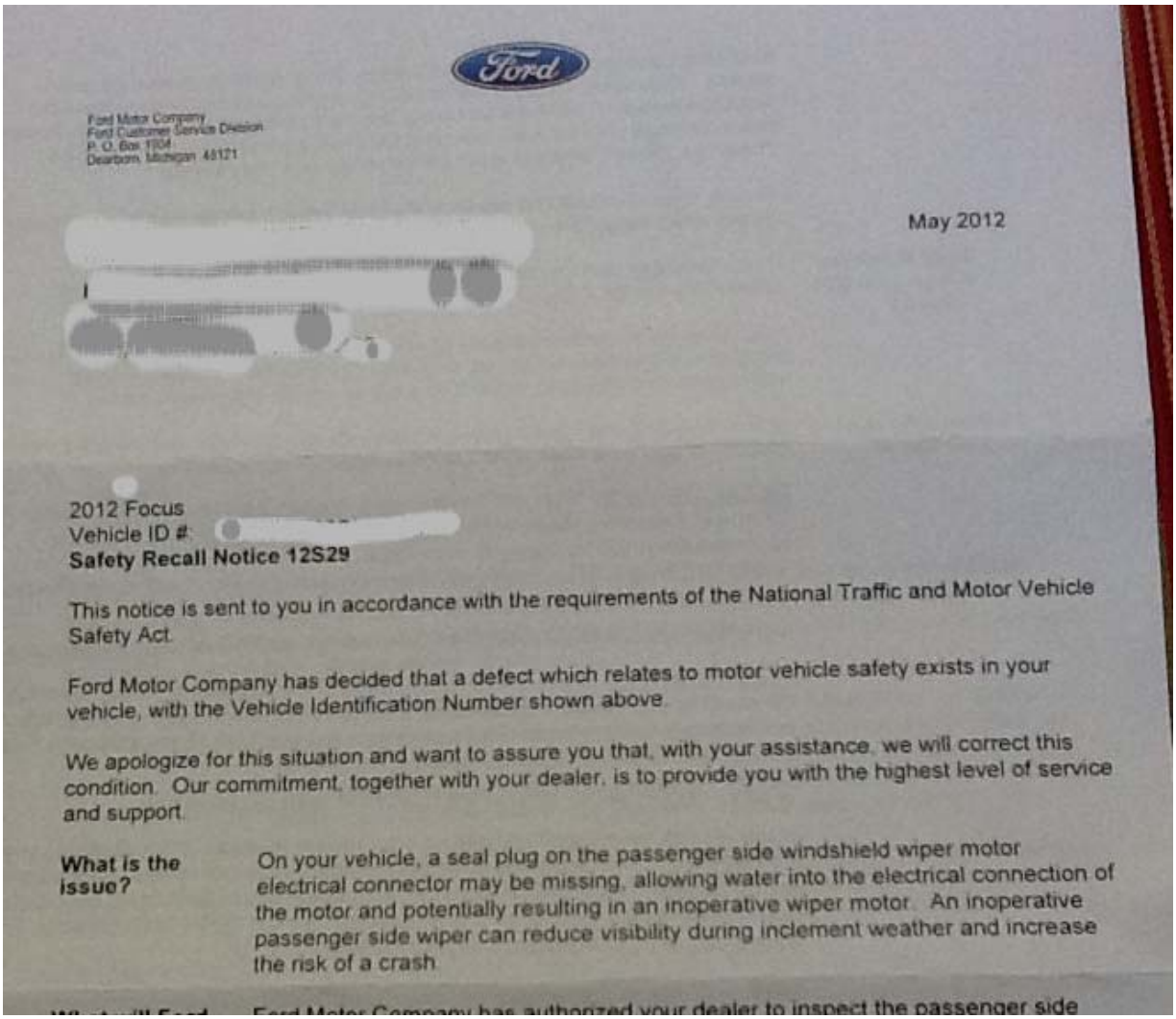
On June 27, 2014, Graco submitted a DIR recalling approximately 1.9 million rear facing infant car seats which used the QT1 harness buckle.

This Timeliness Query has been opened to evaluate the timing of Graco's defect decision making and reporting of the safety defect to NHTSA.

Figure 6 - Resume Concerning Timeliness Issues

Management

After NHTSA's Investigation of defect and a recall is warranted, NHTSA must oversee management of the recall process. Management of the investigation, specifically increasing rates of completion (amount of vehicles which have executed the recall repair), is an ongoing focus area of improvement.



Ford Motor Company
Ford Customer Service Division
P. O. Box 1904
Dearborn, Michigan 48121

May 2012

[redacted]

2012 Focus
Vehicle ID #: [redacted]
Safety Recall Notice 12S29

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

Ford Motor Company has decided that a defect which relates to motor vehicle safety exists in your vehicle, with the Vehicle Identification Number shown above.

We apologize for this situation and want to assure you that, with your assistance, we will correct this condition. Our commitment, together with your dealer, is to provide you with the highest level of service and support.

What is the issue? On your vehicle, a seal plug on the passenger side windshield wiper motor electrical connector may be missing, allowing water into the electrical connection of the motor and potentially resulting in an inoperative wiper motor. An inoperative passenger side wiper can reduce visibility during inclement weather and increase the risk of a crash.

Figure 7 - Sample Recall Notice to Ford Customer

A safety recall can be independently done by a manufacturer or ordered by NHTSA. While NHTSA can order recalls, this is rare, and generally there are two types, OEM initiated and NHTSA influenced, the latter group are from those that the OEM does during or at the end of an investigation.

Most recalls (in some years over 80%) are initiated by OEMs independently of NHTSA. In either case, the manufacturer must file a public report describing the safety-related defect or noncompliance with a Federal Motor Vehicle Safety Standard (FMVSS), the involved vehicle/equipment population, the major events that resulted in the recall determination, a description of the remedy, and a schedule for the recall. NHTSA monitors each safety recall to ensure the manufacturers provide owners safe, free, and effective remedies according to the Safety Act and Federal regulations.

What is the political landscape associated with enhancing the NHTSA safety defect recall process?

NHTSA is considering major changes to its defect analysis and recall process. With recent major recall events such as the Takata airbag issue, GM ignition switch and the Toyota unintended acceleration, NHTSA is under pressure to change the defect investigation process and make it more thorough.

The agency has taken steps in the past year to reach out to industry stakeholders and solicit input on improving the process by which defects are identified and completion of the recall process is increased. Congress has also increased pressure on NHTSA improve the defect investigation and recall process, but has provided no additional funding to the agency to execute the improvement.

Some experts interviewed for this report believe that the anticipated changes to the recall process may happen by the end of 2016, when the administration will make a wholesale change. It is likely that the current administration would like to claim improving the recall system as part of its legacy.

NHTSA recently held a workshop on April 28, 2015. Half of the workshop was televised on YouTube and the second half was private breakout sessions. The breakout sessions were managed and designed by NHTSA to elicit feedback from very specific groups of stakeholders. More workshops are expected, the next will be in the summer or fall. Attendees of this workshop included OEMs, representatives of the OEMs, suppliers and their manufacturers, individual dealers, and groups of dealerships and their representatives. Dealerships are likely to play a significant part in the administration's effort to increase the completion rate as dealers are the most financially motivated of all of the stakeholder groups. The bulk of dealers' profits comes from the dealers' repair operations, so traffic through their shop to complete a recall is not only guaranteed revenue, but also provides an opportunity for client contact, interaction and the opportunity find other potential issues that need attention from the repair shop.

Atkins would also point out that in its most recent budget request, NHTSA did not request funding for changes in the defects process.

Which are the proponents and opponents looking to making changes in the process?

Proponents

- **Public Citizen -** Public Citizen is a self-proclaimed advocate for the people. Their website describes them as "the people's voice in the nation's capital. Since our founding in 1971, we have delved into an array of areas, but our work on each issue shares an overarching goal: To ensure that all citizens are represented in the halls of "power."

    - **Advocates for Highway and Auto Safety -** Advocates for Highway and Auto Safety is an alliance of consumer, health and safety groups and insurance companies and agents working together to make America's roads safer. The organizations' website describes the following "successes" as related to the NHTSA recall process:
        - For the first time in 40 years, DOT is required to issue vehicle safety standards to improve occupant protection on motor coaches including seat belts, roof crush strength, anti-ejection window glazing, tire pressure monitoring and rollover protection, these are all NTSB recommendations that have never been implemented. DOT is also directed to conduct research and testing on fire prevention standards, interior impact protection, compartmentalization and crash avoidance systems, and, if appropriate, issue rules.
        - Child safety measures including regulatory actions on rear seat belt reminders, the performance of child safety seats in frontal and side impact crashes, improvements to the LATCH or child seat anchor system, reminder systems for unattended children left in rear seating positions and consumer information on the performance of child safety seats in side impact crashes.
        - Increased fines for automakers that mislead the agency on safety defects, whistleblower protections and improved consumer information on vehicle safety problems.

Opponents

The automotive OEMs have historically been opposed to unfunded mandated changes in their reporting requirements. The more details that are required and more onerous the reporting process, costs increase for an industry that already runs on razor thin profits. However, after more recent issues with airbags and unintended acceleration, the OEMs have been at the forefront of working with NHTSA. At the most recent workshop, described above, GM was the main speaker and demonstrated the OEMs willingness to be in front of changes in the defects analysis process.

What changes are anticipated or likely and what is the timeframe?

As mentioned above, from recent workshops conducted by NHTSA, there is a focus on completing recalls. That is, NHTSA is at least focused on increasing the amount of vehicles which actually execute the required recalls. Secretary of Transportation, Anthony Foxx said "Recalls are only successful and can only save lives if they end up in getting the cars fixed."

These and any other changes are likely to be completed by the end of the current presidential administration, the end of 2016. Interviews with several colleagues listed below hint that the current administration would like to count improving completion rate as part of its success story.

Interviews

John Fitzpatrick, Stratacomm
Suzanne Murtha met with John Fitzpatrick and Jennifer Heilman from Stratacomm on May 20, 2015. Both were very helpful in understanding the role of the public and public outreach in the process of defect analysis and recall. The conversation, however, was somewhat limited due to the potential conflict of interest with several of Stratacomm's clients including NHTSA and Nissan.

Paul Aussendorf, GAO
Suzanne Murtha met with Paul Aussendorf of the Government Accountability Office (GAO) on May 8, 2015. GAO was helpful in understanding the former landscape of defect investigation and also in understanding what GAO is planning to investigate going forward, their approach and what topics are of deepest concern for their organization.

NHTSA
Suzanne Murtha interviewed a NHTSA staffer who preferred to remain anonymous. He was very helpful with regard to understanding the history and the planned improvements to the process as well as understanding exactly how this system is executed at US DOT. He also was very interested in partnering with AAA in the future.

OEM
Suzanne Murtha interviewed a colleague from an OEM who prefers to remain anonymous. His perspective on the topic of recalls was very helpful in understanding why the available data is not easy to access or manipulate. He also held a high level position with an OEM before the most recent round of defect analyses, and was able to describe in depth the problems with the former approach to defects and how the newer requirements solved some of the problems regarding OEMs sharing data.

George Reagel

At the request of AAA, Suzanne Murtha interviewed George Reagel, former Federal Highway Administration's Associate Administrator for Motor Carriers and Highway Safety. George had some valuable information about how former NHTSA processes functioned.

TREAD Act (Transportation Recall Enhancement, Accountability, and Documentation)

The following is mostly excerpt from NHTSA documentation:

The TREAD Act was enacted on November 1, 2000, as a direct consequence of hearings before the Committee on Energy and Commerce on the safety of Firestone tires and related matters. In the course of the hearings, the Committee determined that NHTSA could have detected the problems with the tires sooner if it had obtained reports about the tires problems in a timelier manner.

The TREAD Act therefore contains provisions requiring vehicle and equipment manufacturers to report periodically (currently monthly) to NHTSA on a wide variety of information that could indicate the existence of a potential safety defect and to advise NHTSA of foreign safety recalls and other safety campaigns. The Act increases civil penalties for violations of the vehicle safety law and provides criminal penalties for misleading the Secretary about safety defects that have caused death or injury. It authorizes the Secretary of Transportation to require a manufacturer to accelerate its program for remedying a defect or noncompliance if there is a risk of serious injury or death, and requires that manufacturers must have a plan for reimbursing owners who incur the cost of a remedy before being notified by the manufacturer. It also prohibits the sale of motor vehicle equipment, including a tire, for installation on a motor vehicle if the equipment is the subject of a defect or noncompliance recall. In a remedy program involving tires, the manufacturer must include a plan that prevents replaced tires from being resold for use on motor vehicles. The Act also directs the Secretary to undertake a comprehensive review of the way in which NHTSA determines whether to open a defect or noncompliance investigation.

In addition, the TREAD Act directs the Secretary of Transportation to conduct rulemaking actions to revise and update the Federal motor vehicle safety standards (FMVSS) for tires, to improve labeling on tires, and to require a system in new motor vehicles that warns the operator when a tire is significantly underinflated. The Act also directs the Secretary to develop a dynamic rollover test for motor vehicles, to carry out a program of dynamic rollover tests, and to disseminate the results to the public.

The TREAD Act required NHTSA to complete 15 separate rulemaking actions, three reports, two studies, and one strategic plan. Many of the required actions had tight deadlines, some as short as 30 days.

Defects Investigation

Within the defects program, the key TREAD Act provision gives NHTSA the authority to issue a final rule that establishes an Early Warning Reporting System. When this rule is final, motor vehicle and motor vehicle equipment manufacturers are required to report a wide variety of information and to submit relevant documents to us periodically (these requirements are described in more detail in this report). Before the TREAD Act, decisions on whether to open defect investigations had primarily been based on complaints NHTSA received from consumers. NHTSA efforts to identify potential defects in a timely manner had been hampered by an inability to obtain relevant information from the automotive manufacturers. Experience has shown that manufacturers often obtain information suggesting the existence of a safety-related problem months, and sometimes years, before consumer complaints to NHTSA indicate a potential problem.

In January 2001, NHTSA issued an advance notice of proposed rulemaking (ANPRM) to begin implementing the early warning requirement. We followed this with a notice of proposed rulemaking (NPRM) in December 2001. The comment period for the NPRM closed on February 4, 2002. As a result of this rulemaking, the existing requirements (described above) are in place.

The TREAD Act requires manufacturers to notify the Secretary of safety recalls and similar campaigns in foreign countries. In October 2001, we issued a NPRM prescribing the contents of the notifications. The TREAD Act enabled NHTSA to hire additional investigators, doubled the numbers of screeners, and established a single point of contact for outside reporting. All of this information is entered into the Office of Defects Investigation (ODI) database, where all screeners and investigators have access to it.

To improve ODI's information storage and management system and to handle the large volume of information that will be submitted under the early warning rule, NHTSA contracted with the Volpe National Transportation Systems Center (Volpe) to design and implement a new state-of-the-art data warehouse.

Tire-related Regulatory Actions

The TREAD Act directed NHTSA to conduct several actions to improve the safety of tires, including rulemaking to improve the endurance and resistance standards for tires, to

improve the information labels on tires, and to require a warning system to indicate to drivers when a tire is significantly underinflated.

NHTSA issued an NPRM on tire information labeling in December 2001. The comment period closed on February 19, 2002. We are reviewing the comments on the NPRM and expect to meet the June 1, 2002 deadline for this rulemaking. The improved information resulting from this rule should make it easier for consumers to find and understand safety information about their tires.