Quantifying Tire-related Deaths and Injuries in U.S. Motor Vehicles

EXPANDED PRESENTATION FOR
the National Transportation Safety Board
Tire Safety Symposium

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Single Vehicle Crash
1996 Ford Explorer in a Rollover Crash
with Incapacitating Injuries, October, 2012
NASS/CDS Case 2012-49-186

Source: NHTSA, National Automotive Sampling System, CDS XML Case Viewer
What are tire-related crashes?

Crashes precipitated OR affected by:

A pre-crash condition of the tire (e.g. low pressure, bald tires, aged tires, tires with defects in manufacture)

AND/OR

Tire disablements: pre-crash, crash, or post-crash events (e.g., flat tires, tire detreads, debeaded tires)
How can we mitigate tire-related crashes?

By implementing effective safety strategies in the pre-crash, crash, and post-crash stages

The most effective of these are PASSIVE strategies
Some Pre-crash Conditions of Tire-related Crashes

Aged tires
Defective/recalled tires
Worn tires, low-tread depth
Inappropriate tire pressure
Inappropriate tread depth
Inappropriate tire size
Inappropriate load capacity
Some Pre-crash Events in Tire-related Crashes

Tire punctures
Tread separation (with and without loss of tire pressure)
Sidewall, ply, cord separation
Bead separation
Chunking, broken cords, open cracks or splices
Tire valve stem failures
Some Events in Tire-related Crashes

Loss of directional control
Loss of speed control
Loss of pressure
Tire debeading
Resistance to lateral acceleration
Some Post-crash Conditions in Tire-related Crashes

Vehicle disablement
Roadway debris
Vehicle occupants become pedestrians
Categories of Tire-related Crashes
Single Vehicle Crash
1996 Ford Explorer in a Rollover Crash with Incapacitating Injuries, October, 2012
NASS/CDS Case 2012-49-186

Summary: “V 1 was traveling north on a highway. The left rear tire of V 1 blow out, causing the vehicle to rotate clockwise. V 1 rolled over to for [sic] five quarter turns, coming to rest on its left side.”
Tire-related Casualties Also Occur Beyond Specific Vehicles That Have Tire Disablements

Comprehensive casualty summaries should include all victims in multi-vehicle crashes as well as crashes involving non-motorists
Multi-vehicle Crash
NMVCSS Case 2006-78-96

Summary: “The tread separated from the right rear tire of V1 and the driver steered left, causing the vehicle to rotate counterclockwise. V1 departed the left side of the roadway into the median. V1 rolled to the right eight quarter-turns across the median. V1 then entered the eastbound lanes. The driver of V2 steered right to avoid V1, but the right side of V1 struck the left side of V2.”

Tire-related Fatal Crash Involving Pedalcyclist
FARS Case 2010-190247-1

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>ST_CASE</th>
<th>VEH_NO</th>
<th>Field</th>
<th>Code</th>
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<tbody>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>VE_FORMS</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>VE_TOTAL</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>Vehicle DEATHS</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>Sequence 1</td>
<td>Equipment Failure (blown tire, brake failure, etc)</td>
</tr>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>Sequence 2</td>
<td>Pedalcyclist</td>
</tr>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>Sequence 3</td>
<td>Ran Off Roadway – Right</td>
</tr>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>Sequence 4</td>
<td>Ditch</td>
</tr>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>Sequence 5</td>
<td>Rollover/Overturn</td>
</tr>
<tr>
<td>2010</td>
<td>190247</td>
<td>1</td>
<td>FATALS</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: QCS Corp. abstract of FARS, 2010
Secondary Crashes May Also Be Related to Tire Disabalements

Comprehensive casualty summaries should also consider post-crash conditions involving the tires such as:

Vehicle disablement
and/or
Subsequent hazardous pedestrian exposure
Tire Failure Precedes Crash
NASS/CDS Case 1998-3-043

Summary: “...VEHICLE #1 WAS STOPPED IN TRAFFIC (DISABLED) DUE TO A FLAT TIRE. THE DRIVER WAS OUT OF THE VEHICLE ATTEMPTING TO CHANGE THE TIRE WITH ONE PASSENGER IN THE VEHICLE. VEHICLE #2 REAR ENDED VEHICLE #1 CAUSING DAMAGE AND INJURIES TO BOTH VEHICLES AND ALL THE OCCUPANTS...”

Data about Tire-related Crashes
Data Source: State Accident Data

Compiled from police accident reports
Affect quality and coverage of all databases downstream
Data Source: State Accident Data

Important Usage Issue: Coverage and quality of tire-related data on police accident report forms are highly dependent on form design and the workflow of computerized data collection systems.
Data Source: State Accident Data

Important Usage Issue: Coverage and quality of tire-related data on police accident report forms are highly dependent on form design and the workflow of computerized data collection systems.

Vehicle Defects

1. None
2. Brakes
3. Tires
4. Lights (head, signal, tail)
5. Steering
6. Wipers
7. Exhaust System
8. Body, Doors
9. Power Train
12. Suspension
13. Wheels
14. Windows/
15. Windshield
16. Mirrors
17. Truck Coupling/
18. Trailer Hitch/
19. Safety Chains
20. Other, Explain in Narrative
21. Unknown
State Accident Data About Tire-related Crashes
## State Accident Data About Tire-related Crashes

<table>
<thead>
<tr>
<th>STATE</th>
<th>LICENSED DRIVERS IN 2012</th>
<th>FATALITIES IN 2012</th>
<th>FATALITY RATE PER 10K LICENSED DRIVERS IN 2012</th>
<th>FATALITIES INVOLVING LIGHT PASSENGER VEHICLES IN TIRE-RELATED CRASHES 2010-2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>7,019,000</td>
<td>938</td>
<td>1.34</td>
<td>4</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>4,057,000</td>
<td>615</td>
<td>1.52</td>
<td>30</td>
</tr>
</tbody>
</table>


Tire-related fatalities compiled by QCS Corp., see below for methodology
Data Source: State Accident Data

Important Usage Issue: Coverage and quality of tire-related data on police accident report forms are highly dependent on form design.

Wisconsin Motor Vehicle Accident Report Form, 2007

Michigan Traffic Crash Report Form, 2004
Data Source: State Accident Data

More Important Usage Issues:

Reporting thresholds differ widely between states

Reporting of a crash often at discretion of police

Reporting of crash details depends on the training and judgment of reporting officers

Demands that research be pre-approved by states

Future utility in research threatened by privatization of state records for sale
Tire-related Casualty Data from NHTSA That Begin with Crashes Reported to Police:

*Source: QCS Corp. summary of NASS/CDS*
Data Source: NASS/CDS

NASS/CDS is a probability sample of police reported towaway crashes involving passenger cars, light trucks, and vans.

3,385 crashes were sampled in 2013 (~1 in 600 sample rate).* An excellent resource to understand tire-related crash issues in specific cases through crash-related photography.

*Source: QCS Corp. summary of NASS/CDS
Data Source: NASS/CDS

Detailed data are gathered by trained investigators – but days or weeks after the crash. Records an initial critical pre-crash event of “Blowout / Flat Tire” (PREEVENT = 1 since 1992)
Data Source: NASS/CDS

PREEVENT = 1: “Blow out or flat tire is used when a vehicle in motion loses control as the result of an immediate tire disruption. Examples include blow out, rapid air loss, tread separation, etc.”
Data Source: NASS/CDS

Usage Issues:

Coverage and quality of reported Tire Identification Numbers can be improved

Unusual distribution of tread-depth measurements associated with English-to-metric conversion
Data Source: NASS General Estimates System (GES)

Detailed data are coded from police accident reports.
The coding of tire-related issues has changed over time, requiring care in time series analyses.

*Source: QCS Corp. summary of NASS/GES*
Data Source: NASS/GES

NASS/GES is a random, probability sample of crashes reported to police involving property damage, injury, or death.

61,598 crashes were sampled in 2012 (~1 in 90 sample rate).*

*Source: QCS Corp. summary of NASS/GES
Data Source: National Motor Vehicle Crash Causation Survey (NMVCCS)

NMVCCS was a random, probability sample of police-reported crashes occurring between 6 a.m. and midnight and to which emergency medical services had been dispatched. 2,113 crashes were sampled and fully investigated in 2005-2006. Crash investigations could potentially have begun before an accident scene was cleared.

Data Source: NMVCCS

Detailed tire data were collected about the pre- and post-crash conditions of the tires.

A pre-crash critical event of “Blow out/flat tire” initiating a crash was identified and coded: “Used when a vehicle in motion loses control as the result of a tire ‘air out.’”

Source: NHTSA, 2005, NMVCCS Variable Coding Manual
Data Source: NMVCCS

Estimates by NHTSA include:

**VARIABLE: PREEVENT (CRITICAL PRE-CRASH EVENT)**

<table>
<thead>
<tr>
<th>PREEVENT (Attribute Code)</th>
<th>PREEVENT (Description)</th>
<th>UNWEIGHTED FREQUENCY</th>
<th>UNWEIGHTED PERCENT</th>
<th>WEIGHTED FREQUENCY</th>
<th>WEIGHTED PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blow out/flat tire</td>
<td>54</td>
<td>0.4</td>
<td>14,150</td>
<td>0.4</td>
</tr>
</tbody>
</table>

and

“...of the estimated 3,889,770 vehicles involved in the NMVVCS crashes, 5 percent experienced tire problems in the pre-crash phase.” (Nearly 200,000 vehicles)

Source: NHTSA, 2008, National Motor Vehicle Crash Causation Survey
NMVCCS DATABOOK OF NMVCCS VARIABLES, p. 298
and NHTSA, 2012, "Tire-Related Factors in the Pre-Crash Phase", p. vi
Data Source: NHTSA’s Consumer Complaint Data

<table>
<thead>
<tr>
<th>Date Complaint Filed: 09/11/2012</th>
<th>Date of Incident: 09/08/2012</th>
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</thead>
<tbody>
<tr>
<td>Component(s): TIRES</td>
<td>NHTSA ID Number: 10475064</td>
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</table>

All Products Associated with this Complaint

<table>
<thead>
<tr>
<th>Vehicle Make</th>
<th>Model</th>
<th>Model Year(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORD</td>
<td>EXPLORER</td>
<td>1993</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tire Brand Name</th>
<th>Tire Line / Tire Size</th>
<th>Production Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRESTONE</td>
<td>ATX</td>
<td>-</td>
</tr>
</tbody>
</table>

Details

<table>
<thead>
<tr>
<th>Crash:</th>
<th>Fire:</th>
<th>Number of Injuries:</th>
<th>Number of Deaths:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Manufacturer: FIRESTONE TIRE & RUBBER CO., Ford Motor Company

Vehicle Identification No. (VIN): Not Available

SUMMARY:
Data Source: TREAD Act Early Warning Reporting

Early Warning Reporting - Search Results

Information  Downloads  Documents

EWR Death & Injury Results
Go back to EWR Results Summary page.

Manufacturer Name: Cooper Tire & Rubber Co.
Reporting Category: TIRES
Reporting Period: 2014, Q2
Report Created on: Nov-24-2014 10:36 AM

Results: 2 | All records displayed

Tire Line: STARFIRE RS-C 2.0
Tire Size: 225/50R17
Tire Production Year: 2013

Vehicle Make: MITSUBISHI
Vehicle Model: ECLIPSE
Reported Components:
A. Unknown

Deaths: 0
Injuries: 1
TIN: RM40LDJ4713
Incident Date: 04/30/2014
Sequence ID: 1
Vehicle Model Year: 2007
State/Foreign Country: TX

Data Source: TREAD Act Early Warning Reporting

Early Warning Reporting - Search Results

EWR Property Damage Results
Go back to EWR Results Summary page.

| Manufacturer Name: Cooper Tire & Rubber Co. |
| Reporting Category: TIRES |
| Reporting Period: 2014, Q2 |
| Report Created on: Nov-24-2014 10:41 AM |

Results: 31 | 1 - 15 Displayed

| Tire Line: ARIZONIAN SILVER EDITION | Tire Size: 185/65R14 |
| SKU: W123MF444 | Production Year: 2012 |
| Plant Code: U9 |  |

<table>
<thead>
<tr>
<th>Reported Component</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

| Tire Line: ARIZONIAN SILVER EDITION | Tire Size: 185/65R15 |
| SKU: W123MF454 | Production Year: 2012 |
| Plant Code: U9 |  |

<table>
<thead>
<tr>
<th>Reported Component</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

Data Source: TREAD Act Early Warning Reporting

Usage Issues Include:

Non-reporting by manufacturers

Auto manufacturers are not required to report claims for vehicles more than ten years old

Tire manufacturers are not required to report claims for tires more than five years old
Data Source: TREAD Act Early Warning Reporting

Usage Issues Include:

Restricted public access to underlying information for deaths and injury claims

Prohibited public access to warranty claims, consumer complaints, field reports, tire production counts, etc.

Lack of specificity for failure modes

Allows reporting of summary data only
Data Source: Fatality Analysis Reporting System (FARS)

Census of all crashes in US resulting in deaths within 30 days on trafficways customarily open to the public
Records factors coded from police-accident reports related to tires
Finding Vehicles with Tire-related Issues in FARS, 1982-2009

1) Vehicles with any Driver Level Related Factor = Skidding, Swerving, Sliding Due to: “Debris or Objects in Road” or “Ruts, Holes, Bumps in Road” (or “Improper Tire Pressure” 82-05 only) are coded as “missing data.”

2) Vehicles with any Vehicle Related Factor (2 fields) = “Tires” are coded as “Tire-related”

3) Vehicles with any Driver Related Factor (3 fields, 4 since 1997) = “Skidding, Swerving, Sliding Due to Tire Blowout or Flat” are coded as “Tire-related”

4) Vehicles with missing data for all driver related factors AND with missing data for both vehicle-related factors are coded as “missing data.”

5) All others are coded as “Not Tire Related.”
Finding Vehicles with Tire-related Issues in FARS, 2010-2012

1) Vehicles with any Driver Level Related Factors = Skidding, Swerving, Sliding Due to: “Debris or Objects in Road” or “Ruts, Holes, Bumps in Road” are coded as “missing data.”

2) Driver Related Factors (any of 4 fields) = Skidding, Swerving, Sliding Due to “Tire Blow-Out or Flat” are coded as “Tire-related”

3) Critical Event - Precrash = “This vehicle loss of control due to Blow Out Flat Tire” are coded as “Tire-related”

4) Factor Data File, Contributing Circumstances = “Tires” are coded as “Tire-related”

5) Vehicles with missing data for all driver related factors, AND a missing critical event, AND without any data in the FACTOR file are coded as “missing data.”

6) All others are coded as “Not Tire Related.”
Data Source: Fatality Analysis Reporting System (FARS)

Changes in Identifying Tire-related Crashes in FARS:

Driver factors expanded from 3 fields to 4 in 1997
Critical pre-crash event added in 2010
Since 2010 more than 2 vehicle factors can be coded
Which Dataset Should We Use to Quantify Tire-related Crash Deaths?

- **Crashworthiness Data System**

- **FARS**
  
  U.S. Department Of Transportation
  National Highway Traffic Safety Administration

**QCS CORP**
Hypothesis:

Tire failures are related to heat and climatic conditions. If the proportion of light passenger vehicles in fatal crashes shows appropriate seasonal variability, it would support the use of our methodology and the FARS data.
Percentage of Light Passenger Vehicles with Occupant Fatality That Have Tire-related Issues by Month of Year, Calendar Years 1982-2009, Model Years 1980-2010

Source: QCS Corp. summary of FARS, VINs decoded by VINDICATOR
Note: Minimum population size for any month is 40,319
Weighted Percentage of Light Passenger Vehicles That Have Tire-related Issues by Month of Year, Calendar Years 1992-2012 Based on Critical Pre-crash Events Related to Tires

Source: QCS Corp. summary of NASS/CDS, 1992-2012
Note: Minimum unweighted sample size for any month is 12,526
Conclusion:

This comparison of FARS and NASS/CDS data supports the use of our methodology and the FARS data, rather than the NASS/CDS data.
National Automotive Sampling System
Crashworthiness Data System Estimate
Cited to Support Halt
in Tire Aging Rulemaking:

“...light vehicle tires are performing better on the road as reflected in
[NHTSA’s] most recent crash
data ... from 2007 through 2010 ... a 50 percent reduction in fatalities
(386 to 195)...”

Source: “Tire Aging: A Summary of NHTSA’s Work”, p. 5, p. 4
Has there been a 50 percent reduction in tire-related fatalities?

Some problems with this claim:

1) it is based on a small sample of crashes and concerns a small proportion of the sample;

2) the sample does not include all tire-related crash fatalities;

3) the “50% reduction” is not presented as a sample estimate;

4) the sample estimate is not presented with an appropriate statistical confidence interval; and

5) the estimated reduction is contradicted by the result calculated from an actual census of crash fatalities.

Source: “Tire Aging: A Summary of NHTSA’s Work”, p. 5, p. 4
NHTSA’s Summary of Annualized Average Fatalities Involving Light Passenger Vehicles “in Tire Crashes,” Calendar Years 1995-2010

Occupant Fatalities in Light Passenger Vehicles with Tire-related Issues,
Calendar Years 1992-2012

Note: Vehicle type classified from police-reported body type.
Fatalities in Crashes Involving Light Passenger Vehicles with Tire-related Issues, Calendar Years 1992-2012

QCS Corp. summary of FARS for all road users

NHTSA Summary on Tire Aging for occupants in vehicles with critical tire event only

Note: Counts all deaths in crash; vehicle type classified from police-reported body type.
Percentage of Light Passenger Vehicles with Occupant Fatality That Have Tire-related Issues by Calendar Year 1992-2012

Note: Vehicle type classified from police-reported body type.
Source: QCS Corp. summary of FARS
Percentage of Light Passenger Vehicles with Occupant Fatality That Have Tire-related Issues by Calendar Year 1992-2012 (Using Methodology Unchanged Since 1996)

Note: Vehicle type classified from police-reported body type.
Source: QCS Corp. summary of FARS
Effects of Changes in Identifying Tire-related Crashes in FARS:

99.2% of the tire-related crashes with fatalities in light passenger vehicles in 1997-2012 in would have been identified without the additional fields in the database added after 1996.
Percentage of Light Passenger Vehicles with Occupant Fatality That Have Tire-related Issues by Calendar Year 1992-2012 (Using Methodology Unchanged Since 1996) 2 or Fewer Estimated Years in Service (= CY - MY)

Note: Vehicle type classified from police-reported body type.
Source: QCS Corp. summary of FARS
CDS/FARS Matching (2010-2012):

Matching Key Fields:
1) First 10 characters of the Vehicle Identification Number (VIN)
2) Driver Zip Code
3) Calendar Year
4) Month
5) Day of Week
6) State in which crash occurred

CDS “General Vehicle” records with an occupant fatality (VTREAT =1): 373
Records in which matching key fields are unique: 373

FARS vehicle records with an occupant fatality: 76,504
Records in which matching key fields are unique: 76,489

CDS and FARS records joined by key fields: 326 (87% match rate for the CDS records)

None of the 326 CDS cases record the critical pre-crash event associated with tires
In 4 matched cases, FARS records “possible pre-existing defects or maintenance
conditions that may have contributed to the crash”

Review of these 4 cases shows:

2010-45-2-1: A rollover with a debeaded tire
2010-49-22-1: 2 flat tires and degraded roadway surface
   2010-45-45-1: 1 flat tire
2011-49-102-1: 2 flat, debeaded tires

Source: QCS Corp. summary of NASS/CDS and FARS, 2010-2012

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Matching Key Fields:
1) First 10 characters of the Vehicle Identification Number (VIN)
2) Driver Zip Code
3) Calendar Year
4) Month
5) Day of Week
6) State in which crash occurred

CDS “General Vehicle” records with an occupant fatality (VTREAT =1): 7,208
Records in which matching key fields are unique: 7,208

FARS vehicle records with an occupant fatality: 1,007,069
Records in which matching key fields are unique: 1,000,080
CDS and FARS records joined by key fields: 5030 (70% match rate for the CDS records)

33 CDS cases record the critical pre-crash event associated with tires (PREEVENT=1);
of these 33, FARS does not record a tire issue in 4 cases.

75 FARS cases record a tire issue;
of these 75 cases, CDS does not record PREEVENT=1 in 46 cases;
of these 46 cases, half are departures from the roadway or travel lane.

Source: QCS Corp. summary of NASS/CDS and FARS, 1992-2009
FARS is a Vital Tool for Surveillance of Tire-related Crash Fatalities
Early Warning Surveillance Statistic for Tires – MY 1996 Ford Explorer 4-door, 4x2s Compared to Other MY 1996 Fleets Based on FARS Data

EW/Tires by quarter for 50 vehicle fleets of model year 1996.

Fatal, Single Vehicle Crashes of MY 1996 Ford Explorer 4-door, 4x2s Originally Equipped with Non-recalled Goodyear Tires through Calendar Year 1999

Fatal, Single Vehicle Crashes of MY 1996 Ford Explorer 4-door, 4x2s Originally Equipped with Recalled Firestone Tires through Calendar Year 1999

FARS Shows That Tire Recalls Slowed Tire-related Fatalities in Ford Explorer Crashes – But Only Temporarily

Source: QCS Corp. summary of FARS, 1991-2012

Recommendations: FARS

Utilize FARS data when appropriate to quantify deaths and injuries in tire-related crashes

Commit resources to surveillance of vehicle- and tire-related defects based on FARS data

Provide on-line, public access to underlying police accident reports for FARS cases with narrative crash accounts
Recommendations: Data Reporting

Revise the Model Minimum Uniform Crash Criteria used in accident reports to require “yes/no” checklists itemized by component – including tires – for pre-existing motor vehicle defects or maintenance conditions that may have contributed to a crash.

Require the reporting of Tire Identification Numbers in accident reports and associated databases for tires noted to have a defect or condition that may have contributed to a crash.

Revise the structure of Tire Identification Numbers to include a check digit.
Recommendations: Data Analysts

Consider all casualties in tire-related crashes in appropriate statistical analyses, not just casualties in the specific vehicles with pre-existing tire defects or maintenance conditions.

Consider the value of data about complete populations (e.g., FARS and state data) as well as sample data based on large sampling fractions.

Report sample error estimates and confidence intervals where reasonable and appropriate to important conclusions.
Recommendations:
Database Administrators

Provide links between databases for shared cases or claims – with appropriate safeguards for personally identifying information

Recognize tire failure modes beyond “blow-outs” and “flats” in documentation and training for police and accident report coders
Recommendations: TREAD EWR System

Revise TREAD Early Warning Reporting regulations to allow greater detail in component failure modes

Implement a coding system which links the category of the allegedly failing component with a separate code denoting the type of failure that is alleged.

Require the reporting of individual claims rather than summary counts where appropriate

Remove prohibitions against public access to Early Warning Reporting information
Recommendations: Surveillance for Tire Defects

Start with FARS

Use proven statistical surveillance techniques to rank order potential problems

Alert consumers to potential problems

Monitor and raise recall completion rates

Monitor the effectiveness of recall remedies
Recommendations: Rulemaking

Perform additional analyses to replicate and understand the increase in fatal, tire-related passenger vehicle crashes and casualties despite FMVSS NO. 139 and mandatory TPMS

Reconsider FMVSS tire aging rulemaking based on accurate casualty counts of tire-related deaths and injuries in U.S. motor vehicles
Contact Information:

Quality Control Systems Corp.
1034 Plum Creek Drive
Crownsville, Maryland 21032

Email inquiries or questions:
inquiry@quality-control.us

Telephone (Eastern Time):
410-923-2411
Useful URLs:

This expanded presentation:
http://quality-control.us/NTSB_QCS_Corp_Expanded_41222.pdf

Condensed presentation:
http://quality-control.us/NTSB_QCS_Corp_41208.pdf

Our website:
http://quality-control.us
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Thank You