EXHIBIT D

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25,000 CRASHES A YEAR DUE TO VEHICLE-RELATED ROAD DEBRIS, STUDY FINDS

According to new research released by the AAA Foundation for Traffic Safety, vehicle parts, cargo, or other material that has been unintentionally discharged from vehicles onto the roadway is estimated to cause over 25,000 crashes per year in North America resulting in approximately 80-90 fatalities.

“Although vehicle-related road debris (VRRD) crashes are generally less severe than other crashes, individual incidents can be catastrophic ,” says Peter Kissinger, President and CEO of the AAA Foundation for Traffic Safety. “Moreover, many of the estimated 25,000 VRRD crashes can be prevented if truckers and motorists secure their loads properly and report debris that they encounter on the road.”

The report “The Safety Impact of Vehicle Related-Road Debris” estimated the magnitude of the VRRD safety problem (i.e., frequency and severity of VRRD crashes). Intus Road Safety Engineering, Inc. conducted the research through an extensive literature review, identification and analysis of existing crash data, as well as surveys of current state and provincial practices for preventing and removing VRRD.

A survey of road authorities in the U.S. and Canada on maintenance practices found the three most prevalent forms of VRRD include tire treads, garbage from waste haulers, and lumber and construction materials.

The report recommends several low-cost educational and enforcement approaches as potential countermeasures to prevent VRRD crashes and to reduce crash severity when they occur:

- Educating motorists on load securement and reporting unsafe vehicles, unsecured loads, and road debris
- Educating the motorists on defensive driving, especially around trucks in the event of wheel and tire separations
- Educating fleet maintenance personnel on preventing wheel separations
- Training commercial vehicle drivers to periodically inspect their vehicles and cargo
- Training enforcement officials in vehicle safety and load securement
- Targeting specific groups for enforcement (e.g., waste haulers, landscapers)

- Enacting stricter laws on load securement

Research performed by the AAA Foundation for Traffic Safety can be found atwww.aaafoundation.org . The AAA Foundation for Traffic Safety is an independent, publicly funded, 501 (c)(3) charitable research and educational organization established in 1947 by the American Automobile Association. The AAA Foundation's mission is to prevent traffic deaths and injuries by conducting research into their causes and by educating the public about strategies to prevent crashes and reduce the impact when they do occur.

# # #

Fact Sheet for the AAA Foundation for Traffic Safety's *The Safety Impact of Vehicle-Related Road Debris* Report

- In North America, vehicle-related road debris (VRRD) is estimated to cause over 25,000 crashes per year resulting in approximately 80-90 fatalities.
- VRRD is material—vehicle parts or cargo—that has been unintentionally discharged from a vehicle onto the roadway.
- VRRD is a causal factor in less than one percent of all crashes, and, VRRD crashes are generally less severe than other crashes.
- Recommends transportation agencies consider low-cost education and enforcement approaches by:
    - Enacting stricter laws on load securement
    - Targeting specific groups for enforcement (e.g., waste haulers, landscapers)
    - Training enforcement officials in vehicle safety and load securement
    - Educating fleet maintenance personnel on preventing wheel separations
    - Training commercial vehicle drivers to periodically inspect their vehicles and cargo
    - Educating motorists on defensive driving, especially around trucks in the event of wheel and tire separations
    - Educating motorists on load securement and how to report unsafe vehicles, unsecured loads, and road debris
- Report produced by Gerry Forbes, of Intus Road Safety Engineering, Inc. in association with John Robinson of MRC–Delphi
- Objectives of study:
- Determine the magnitude of the VRRD safety problem (i.e., frequency and severity of VRRD crashes)
- Identify potential countermeasures to prevent VRRD, the incidence of crashes, and/or to reduce VRRD crash severity
- Study methods included:
- Extensive literature review
- Comprehensive analysis of existing crash data
- Two surveys of current state and provincial public agency practices for preventing and removing VRRD

Road gators could soon be on the endangered list. And that's a good thing.
They're not animals, of course. They're those bits of truck tires strewn across America's highways. They're often the tragic result of tires that weren't operating at optimal air pressure, which is hard to maintain on a tractor trailer carrying various loads over hundreds or even thousands of miles through large temperature swings.

Two years ago, a California startup named Aperia Technologies began selling a solution to this problem: the hub-mounted Halo Tire Inflator. Similar to a self-winding watch, it uses a pendulum-type weight to power a pump as the wheel it's attached to turns. Set to a specific pressure, the device is connected to the tire's valve stem via a hose and automatically increases or reduces pressure as needed. One Halo can serve up to two tires.

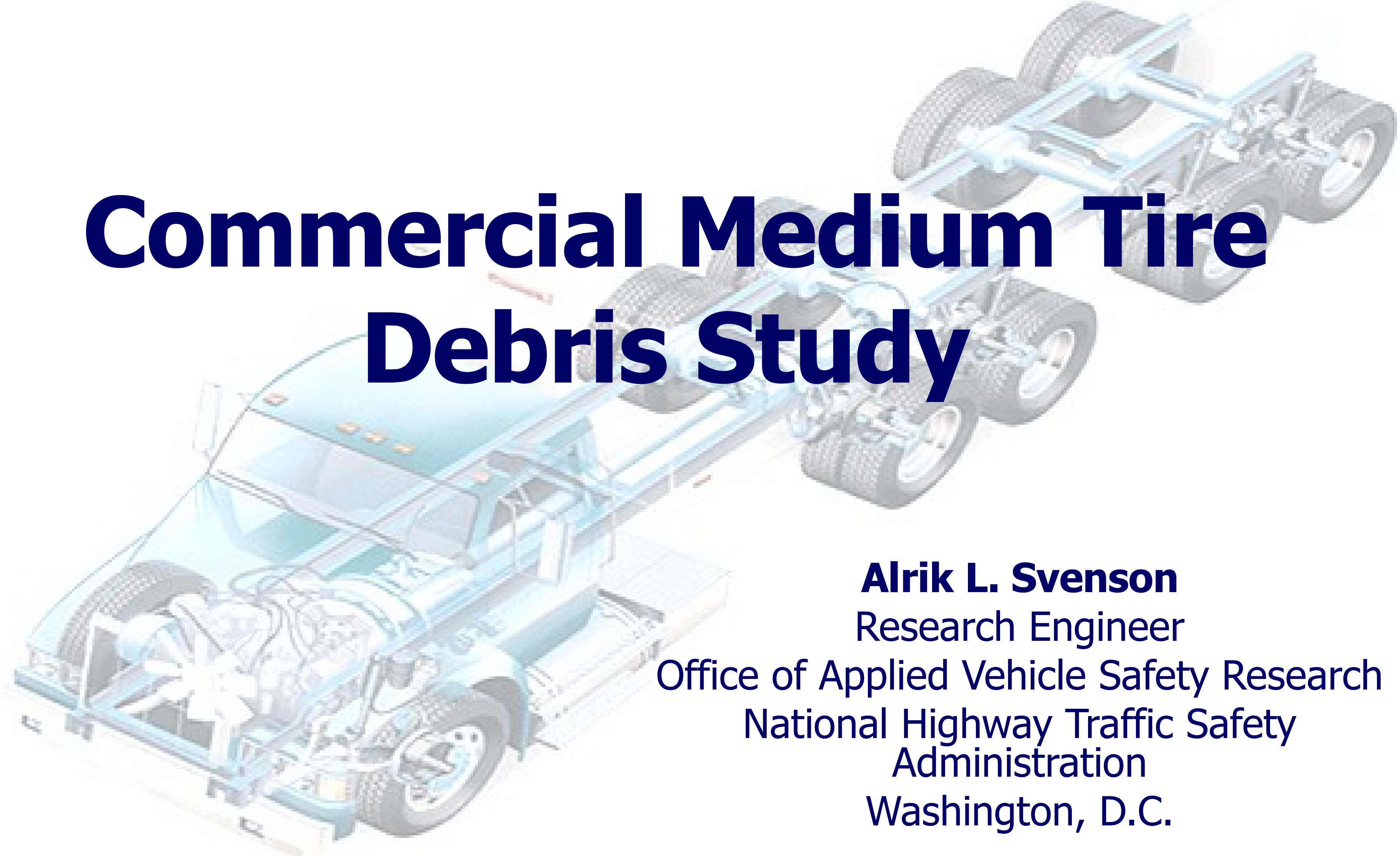
Along with preventing blowouts and increasing tire life, it improves fuel economy and reduces downtime for repairs, all of which adds up to $2,400 annual savings per truck, according to Aperia.

That's exactly what it costs to install on an 18-wheeler, but it's compatible with buses and heavy duty trucks with fewer axles, too. Aperia has sold thousands of systems since 2014 as it has built up its distribution network, but now it's teaming up with Michelin to expand its reach dramatically.

The tire giant has begun offering the co-branded AutoInflate powered by Halo through its commercial services network for a monthly lease of about $15 a pop, and Aperia CEO Josh Carter expects its adoption to explode as it stops more tires from doing just that.
Carter says the company is focused on developing its U.S. market reach, but is also conducting several pilot programs overseas and has started looking into making a version for cars and light duty trucks.

And while a big selling point for the Halo is that it can be retrofitted to pretty much any truck, emissions rules being written for heavy duty trucks could include a bonus for the use of such systems, which would make them appealing to original equipment manufacturers, as well.

As for those gators, enjoy – and avoid – them while they last.



Commercial Medium Tire Debris Study

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SAE Commercial Vehicle Engineering Congress & Exhibition
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www.nhtsa.gov

Acknowledgement

This study was performed for NHTSA by the University of Michigan Transportation Research Institute (UMTRI)

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Tire failure analysis was performed by Smithers Scientific Services in Akron, OH

Michael Blair and associates

Outline

- Objectives
- Previous Studies
- Crash Data Analysis
- Tire Debris Collection Sites
- Tire Debris Collection Plan
- Tire Failure Analysis Tasks
- Results
- Conclusions

Objectives

- Investigate the underlying causes of tire failures in heavy and medium duty trucks
- Determine the extent of truck tire failures for retread tires
- Determine the crash safety problem associated with heavy truck tire failures

Previous Studies

Year	Season	Location	Executing Organization	Pieces Analyzed/ Weight Collected (lbs)	Sponsor
1995	Summer	National	Technology Maintenance Council (ATA)	1,720 pieces Weight Unknown	American Trucking Association
1998	Summer	National	Technology Maintenance Council (ATA)	2,200 pieces Weight Unknown	American Trucking Association
1999	Summer	Phoenix, AZ	Jason Carey	859 pieces Weight Unknown	Arizona DOT
2000	Summer	Virginia	Department of State Police VA & VDOT	27 tires & 127,522 lbs of debris	Virginia General Assembly
2005	Various	National	Bridgestone Firestone	10,291 tires Weight Unknown	Bridgestone Firestone
2007	Summer	National	UMTRI	1,496 pieces 86,028 lbs	NHTSA

Crash Data Analysis

Identify Scope and Nature of the Effects of Truck Tire Failures in Crash Record

- Direct effect - tire blowouts or loss of tread in truck crashes.
- Indirect effect - traffic crashes related to truck tire debris left in the roadway.

Crash Databases Considered:

- Trucks in Fatal Accidents (TIFA) 1999-2004
- General Estimates System (GES) 2002-2005
- Large Truck Crash Causation Study (LTCCS)

Total Defects Coded For Trucks

Defect Coded	Number	%
None	28,861	93.1
Brake System	589	1.9
Tires	269	0.9
Steering	42	0.1
Suspension	36	0.1
Power Train/Engine	26	0.1
Exhaust System	7	0.0
Headlights	18	0.1
Signals	20	0.1

Defect Coded	Number	%
Other Lights	45	0.1
Horn	4	0.0
Wipers	2	0.0
Body, Doors, Other	8	0.0
Trailer Hitch	41	0.1
Wheels	15	0.0
Air Bags	1	0.0
Other	95	0.3
Total	31,016	100.0

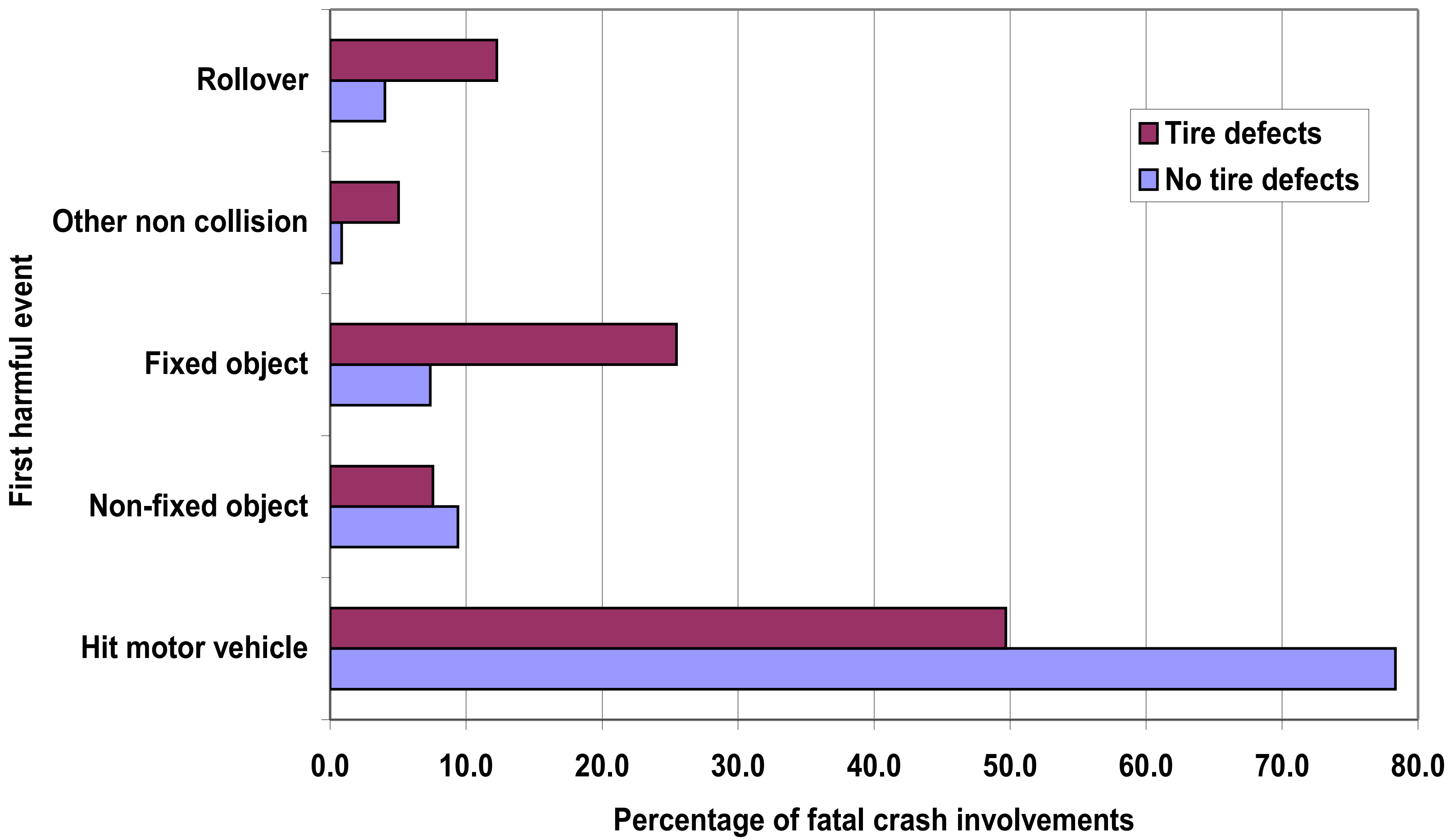
Source: TIFA 1999-2004

Annual Fatalities and Injuries in Fatal Truck Crashes By Coded Tire Defects

Injury Severity	Tire Defects	No Tire Defects	Total
Fatal	55	5,474	5,529
A-injury	19	1,508	1,527
B-injury	16	1,561	1,577
C-injury	10	1,257	1,267
Unknown severity	0	17	17
Total	100	9,816	9,916

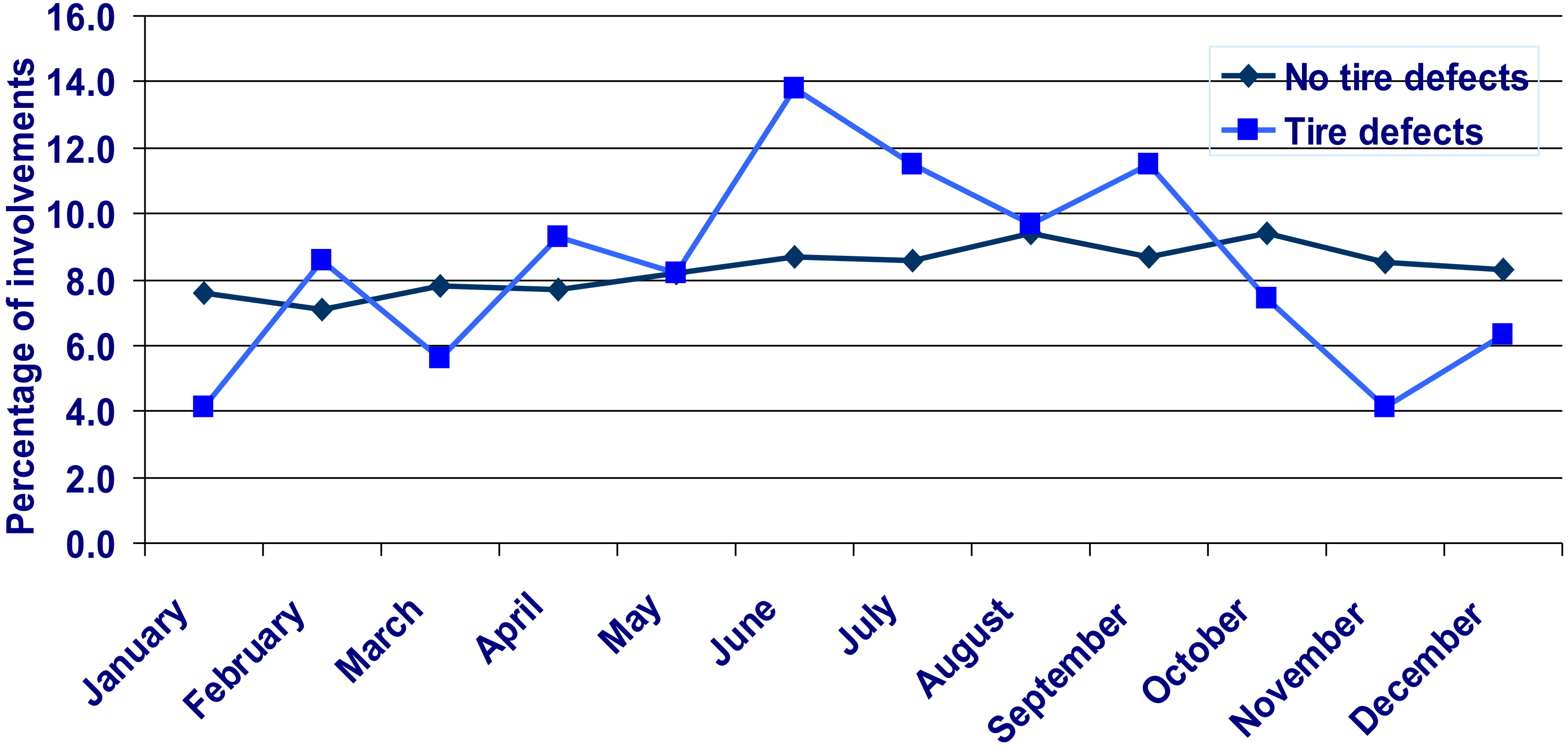
Source: TIFA 1999-2005 Annual Average

First Harmful Event for Fatal Crashes with Coded Tire Defects Vs. No Tire Defects



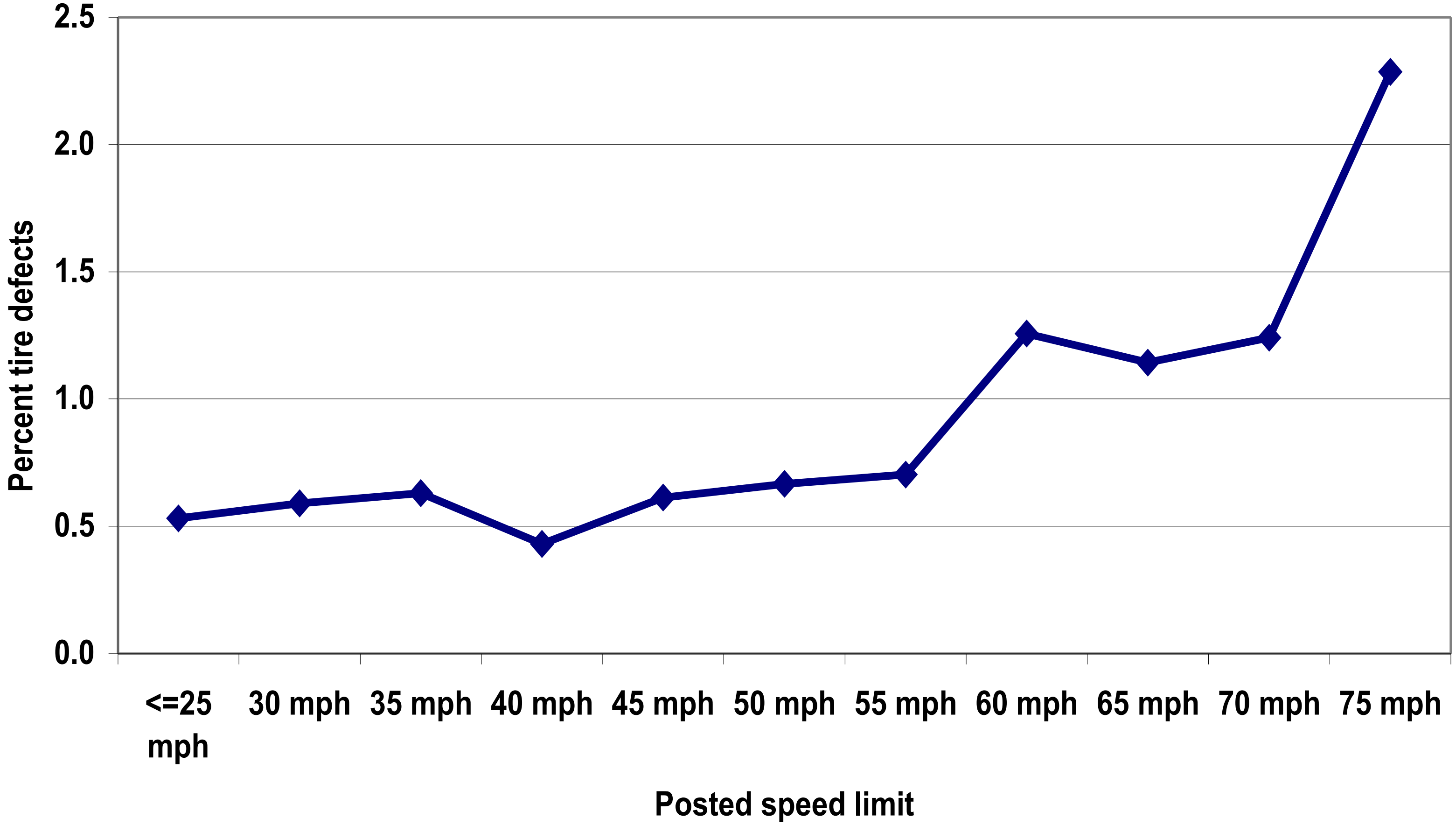
Source: TIFA 1999-2005

Fatal Crash Involvements by Month



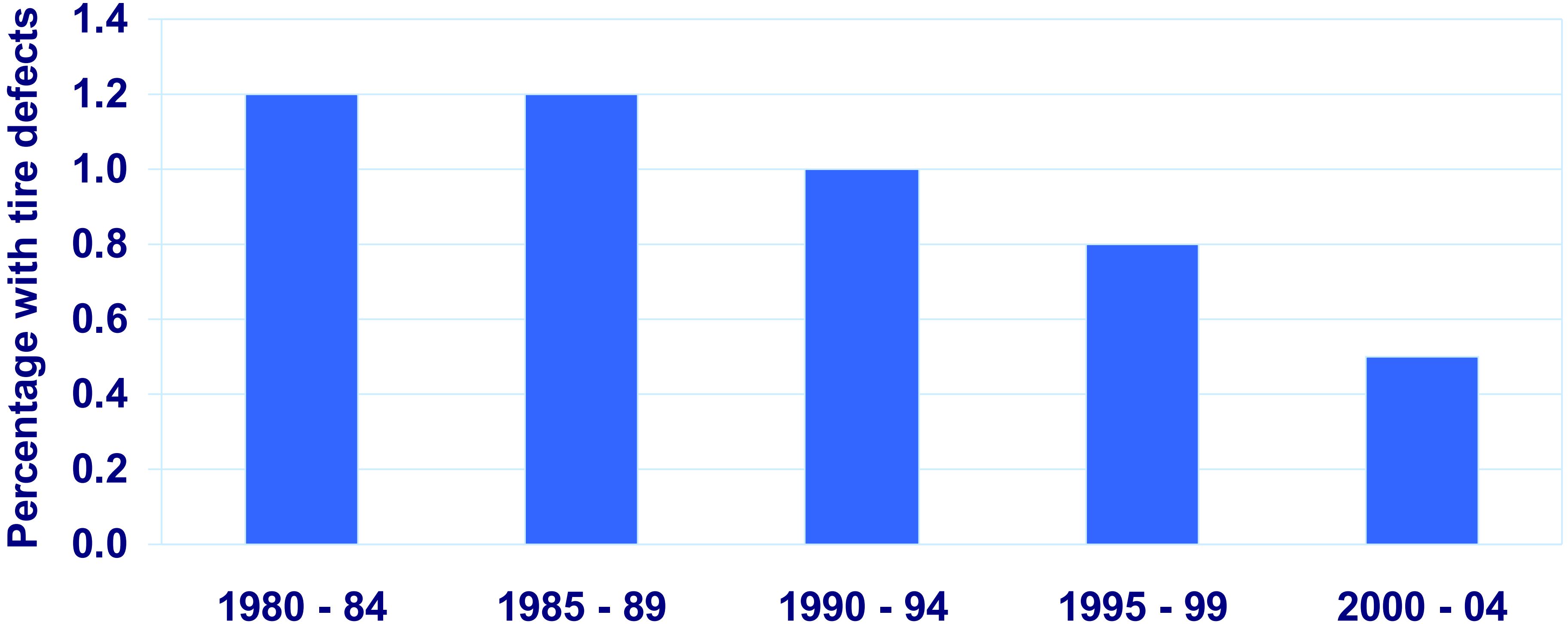
Source: TIFA 1999-2005

Incidence of Coded Tire Defects in Fatal Crashes by Posted Speed Limit



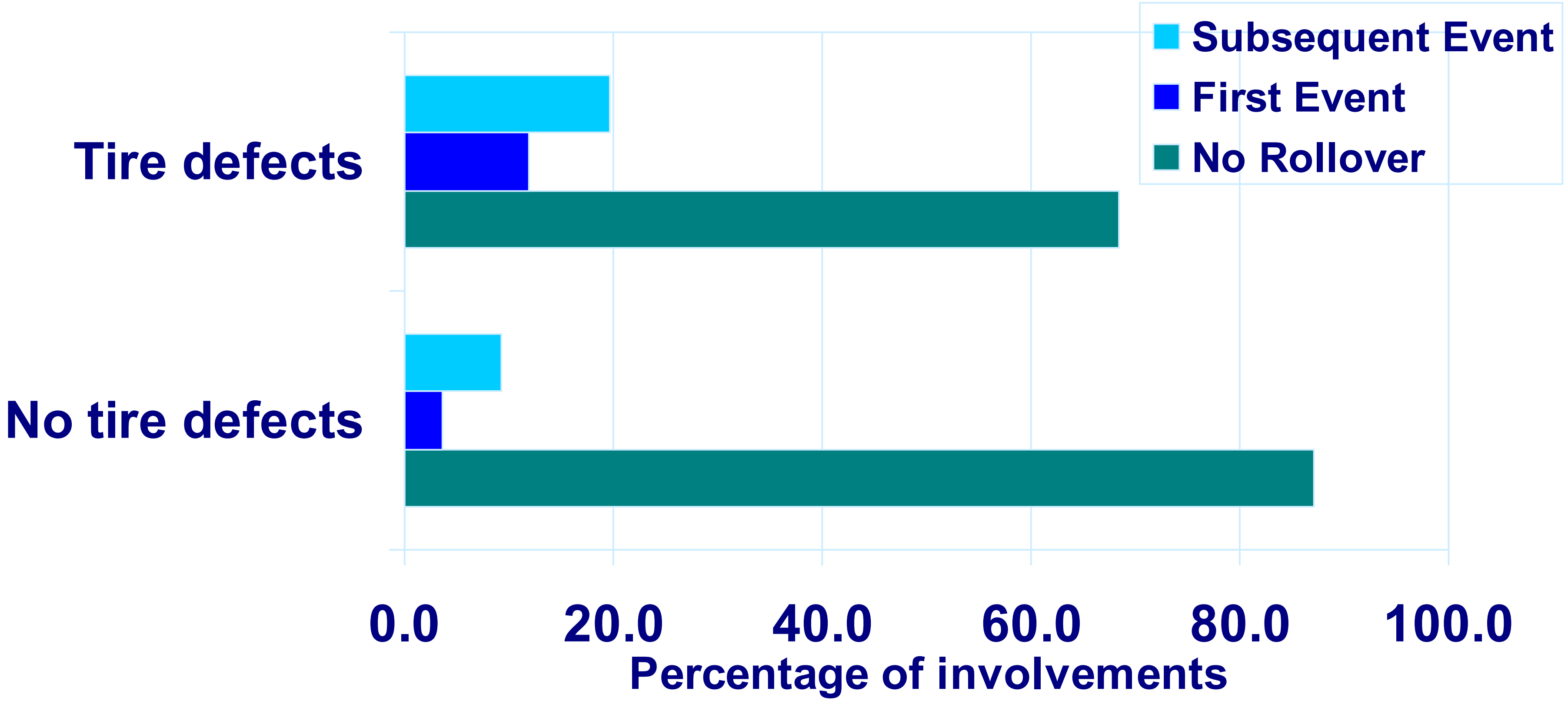
Source: TIFA 1999-2005

Incidence of Coded Tire Defects by Truck Model Year



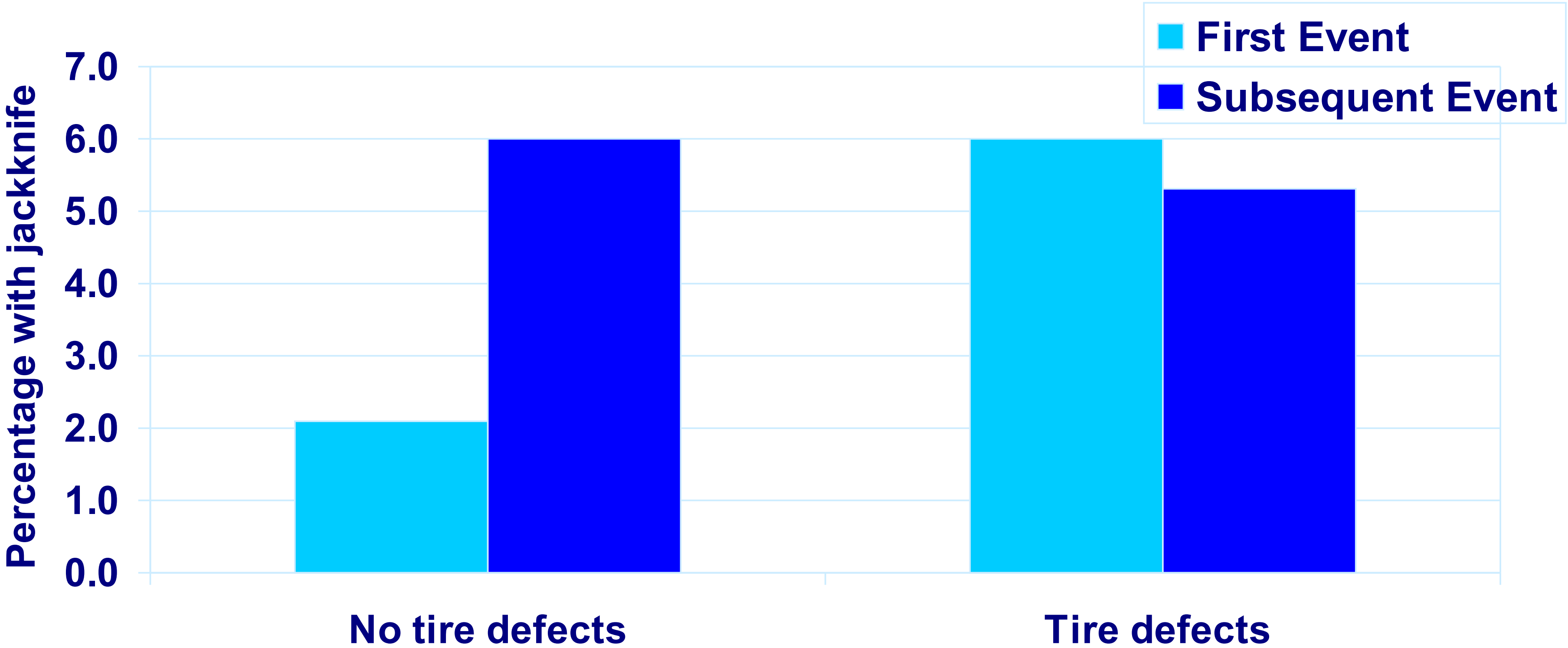
Source: TIFA 1999-2005

Rollover for Trucks Coded with Tire Defects Vs. No Tire Defects



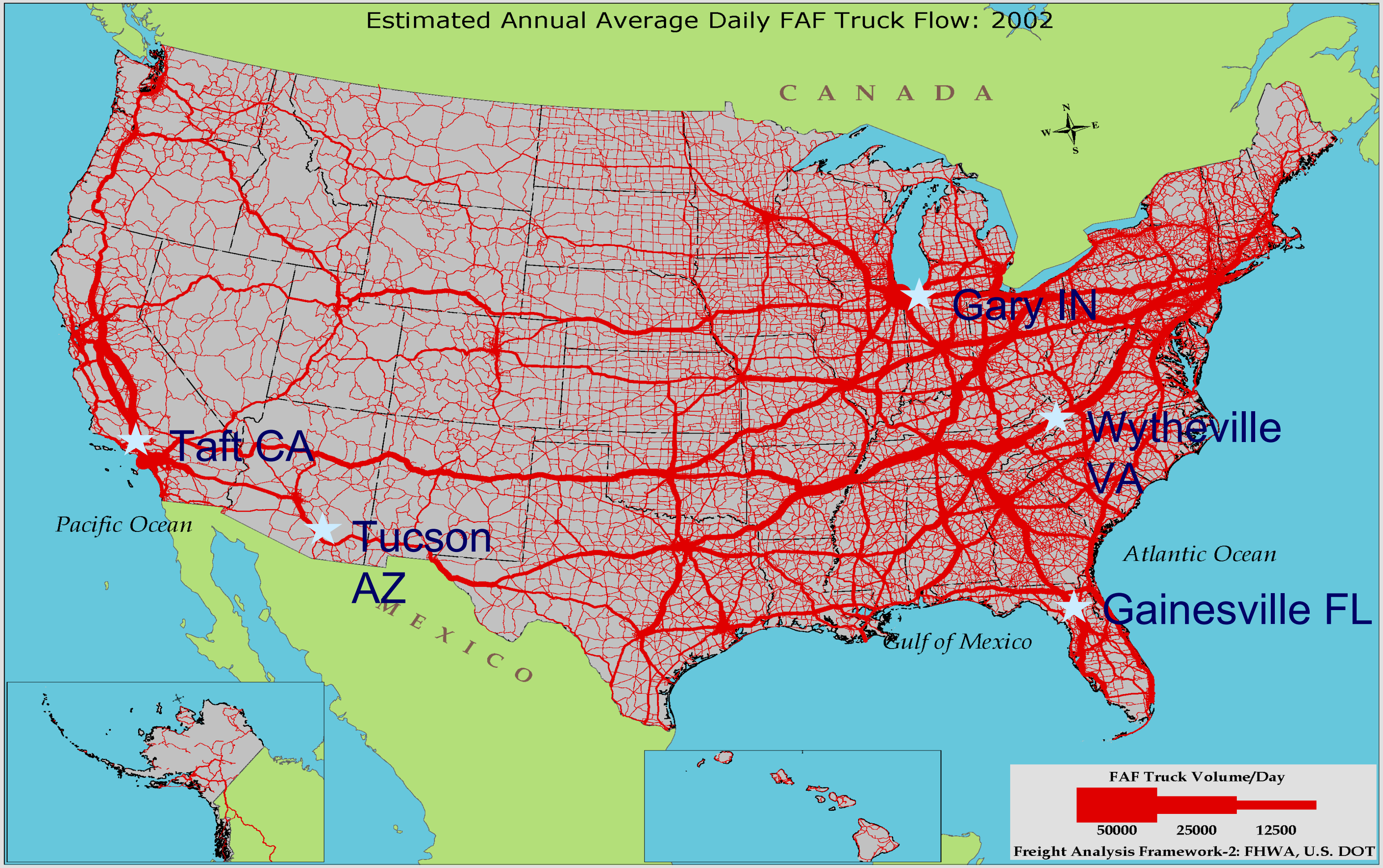
Source: TIFA 1999-2005

Jackknife for Trucks Coded with Tire Defects Vs. No Tire Defects



Source: TIFA 1999-2005

Tire Debris Collection Sites



Tire Debris Collection Plan

- Tire debris collected from State DOT yards for a 2 week period at each site
- Only casings/shreds from large trucks (tractor/trailers 10,000 lbs or more)
- Tire debris collected is a minimum 2 ft in length and 4 inches wide
- Discarded truck tire casings were collected from area truck stops for each site
- A 53’ trailer was loaded at each site and sent directly to Smithers for analysis

Tire Debris Collected in Wytheville, VA

Truck Casings Collected at IN Truck Stop

Tire Failure Analysis

- Conducted at Smithers Akron facility
- Visual, tactile, non-destructive examinations were conducted on each tire fragment/casing sample
- Study team consisted of 6 expert personnel (plus support staff)
- A database was constructed from the examinations for each sample
- Cause of failure determination for each sample
- Photographic record of representative samples

Failure Analysis Categories

Damage/Failure Category	Damage/Failure Sub-Category
Overdeflected Operation	•Tire Was Run While Flat •Sidewall Flex Fatigue Rupture •Detachment ○ Tread only ○ Tread and outer belt(s) ○ Tread & belts from casing •Three-Piece Flex Break
Excessive Heat	•Damage From Excessive Heat
Road Hazard	•Cut/Snag •Impact Break/Rupture •Radial Split •Pinch Shock •Crown Penetration •Sidewall Penetration
Maintenance/Operational	•Excessive Wear •Skid-Through •Petroleum Damage •Improper/Failed Repair •Mounting Damage •Vehicle Damage •Un-repaired Puncture •Incorrect Application

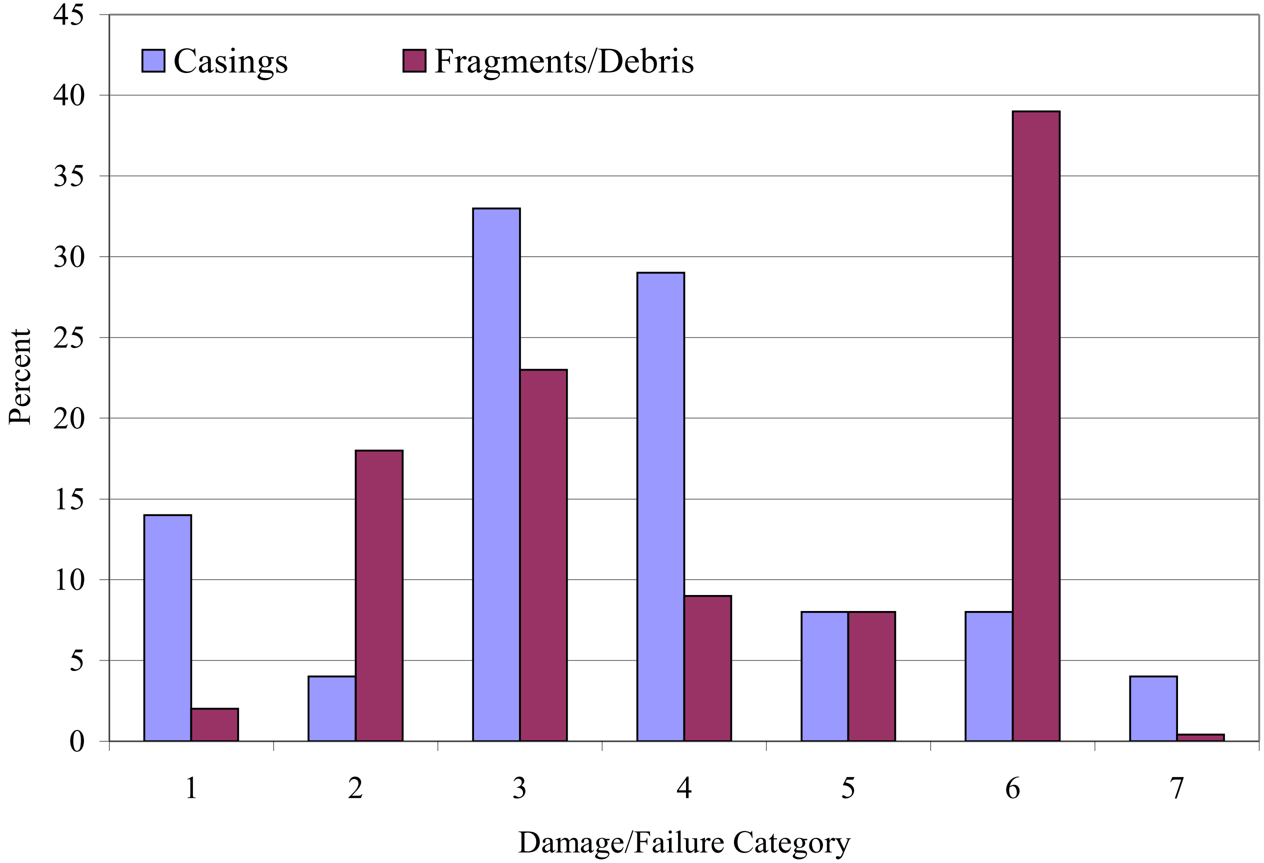
Failure Analysis Categories (Cont.)

Damage/Failure Category	Damage/Failure Sub-category
Excessive Intra-carcass Pressurization	•Compromise of Inner Liner •Bead Damage •Other
Manufacturing/Process Issues	•Bond Failure/Separation (Retread) •Improper Repair •Missed Repair •Questionable Remaining Casing Life •Tire manufacturer Issue •Other
Indeterminate	•Indeterminate Causes

Results - Fragments by Retread Status

Collection Site	Original Tread		Retread		Unknown		Total
Gainesville FL	40	20.2%	125	63.1%	33	16.7%	198
Gary IN	38	23.6%	114	70.8%	9	5.6%	161
Taft CA	41	16.4%	164	65.6%	45	18.0%	250
Tucson AZ	61	18.6%	219	66.8%	48	14.6%	328
Wytheville VA	34	13.1%	190	73.4%	35	13.5%	259
Total	214	17.9%	812	67.9%	170	14.2%	1,196

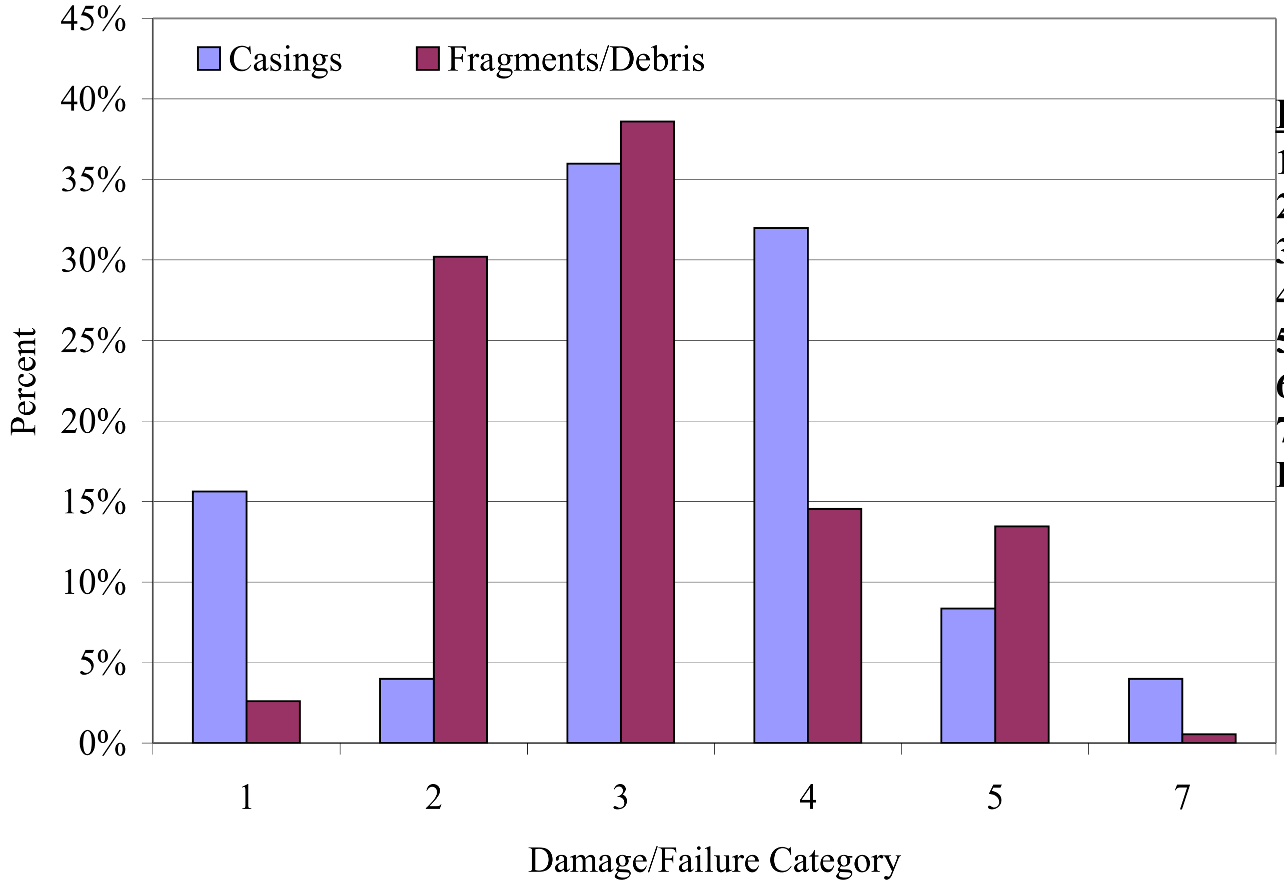
Tire Casings & Fragments Failure Category Determination



Damage/Failure Categories:

1 – Overdeflected Operation
2 – Excessive Heat
3 – Road Hazard
4 – Maintenance/Operational
5 – Manufacturing/Process
6 – Indeterminable
7 – Excessive Intra-Carcass Pressurization

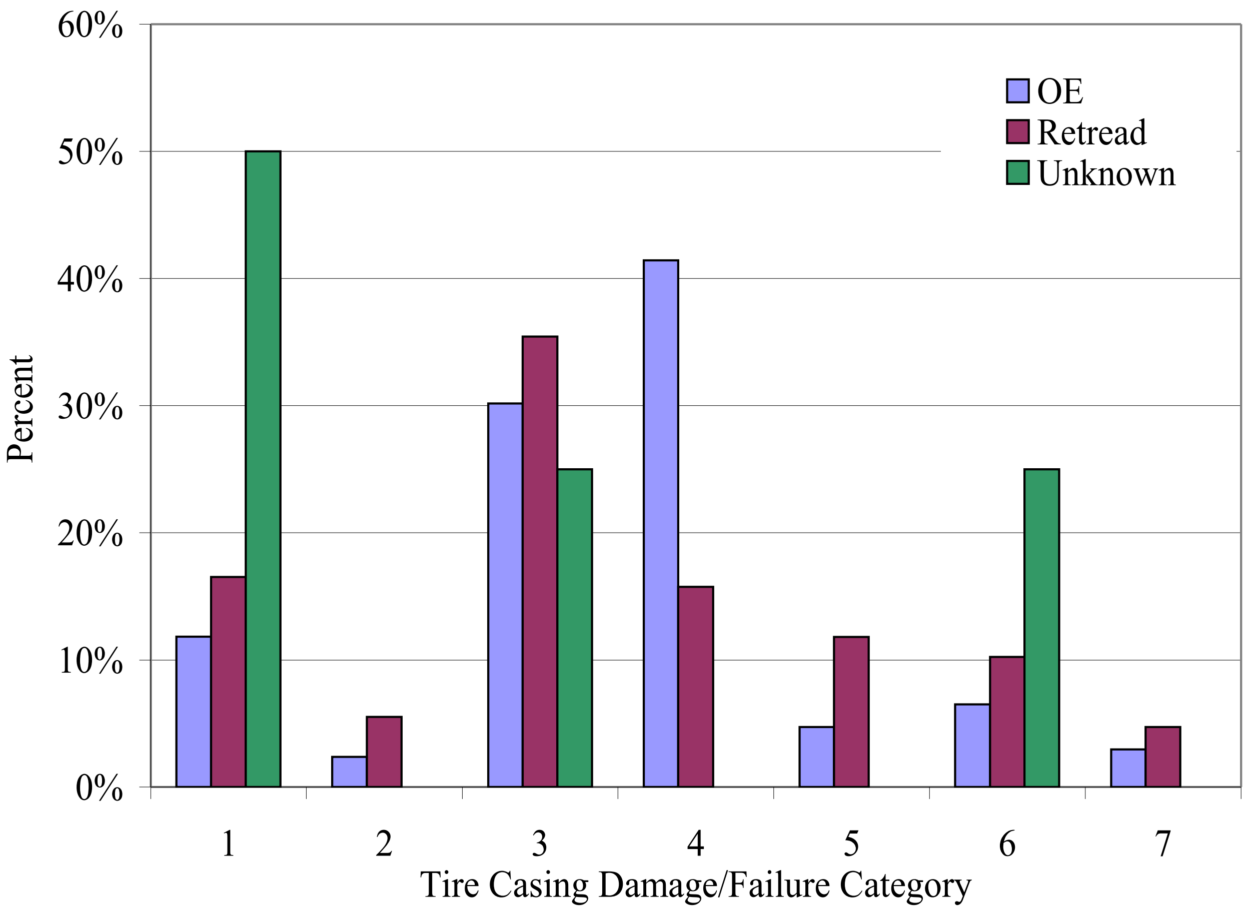
Tire Casings & Fragments Failure Category Determination (excluding indeterminate)



<u>Damage/Failure Categories:</u>

1 – Overdeflected Operation
2 – Excessive Heat
3 – Road Hazard
4 – Maintenance/Operational
5 – Manufacturing/Process
6 – Indeterminable (not shown)
7 – Excessive Intra-Carcass Pressurization

Tire Casings Failure Category OE Vs. Retread



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3 – Road Hazard

4 – Maintenance/Operational

5 – Manufacturing/Process

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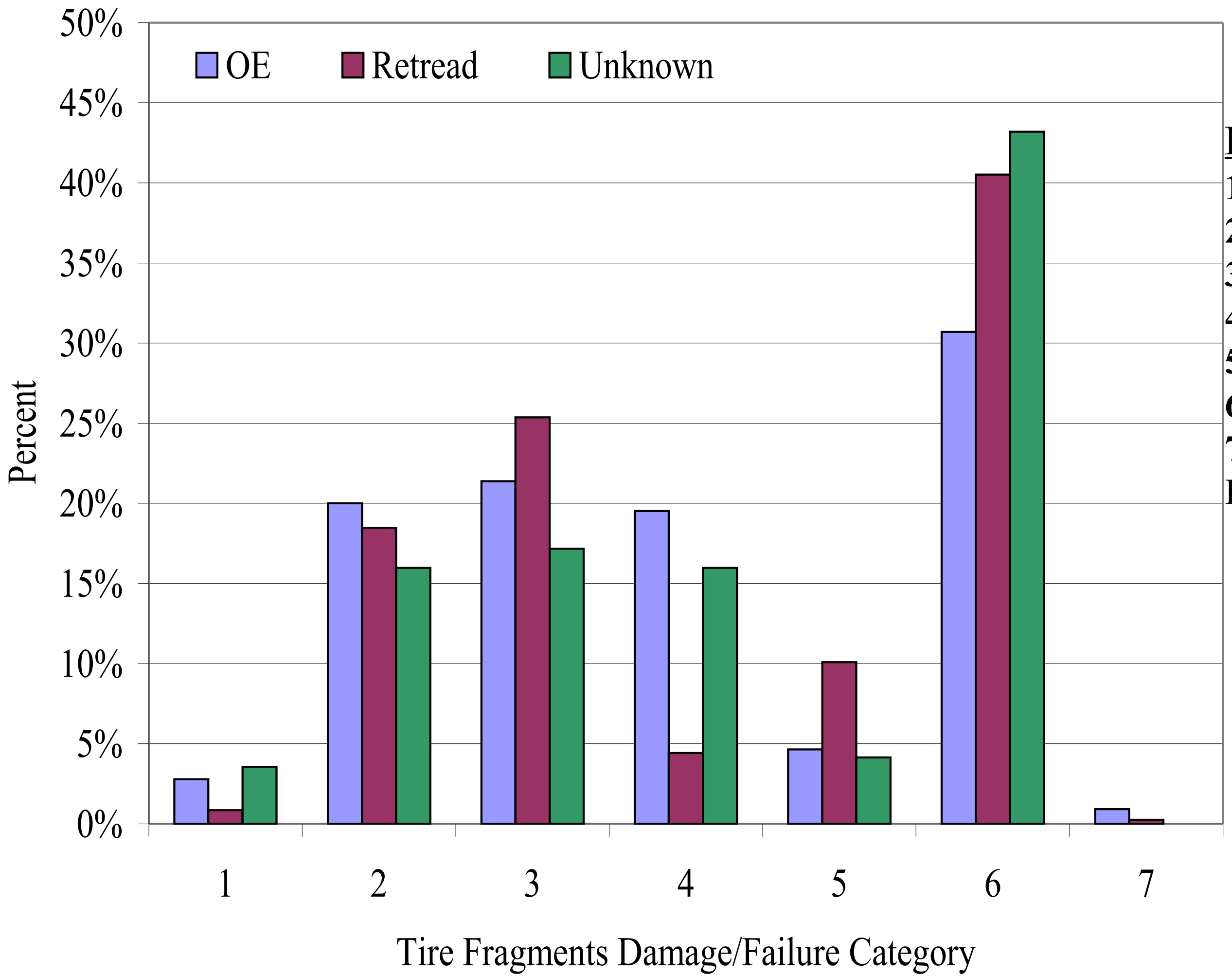
Tire Fragments Failure Category OE Vs. Retread



<u>Damage/Failure Categories:</u>

1 – Overdeflected Operation

2 – Excessive Heat

3 – Road Hazard

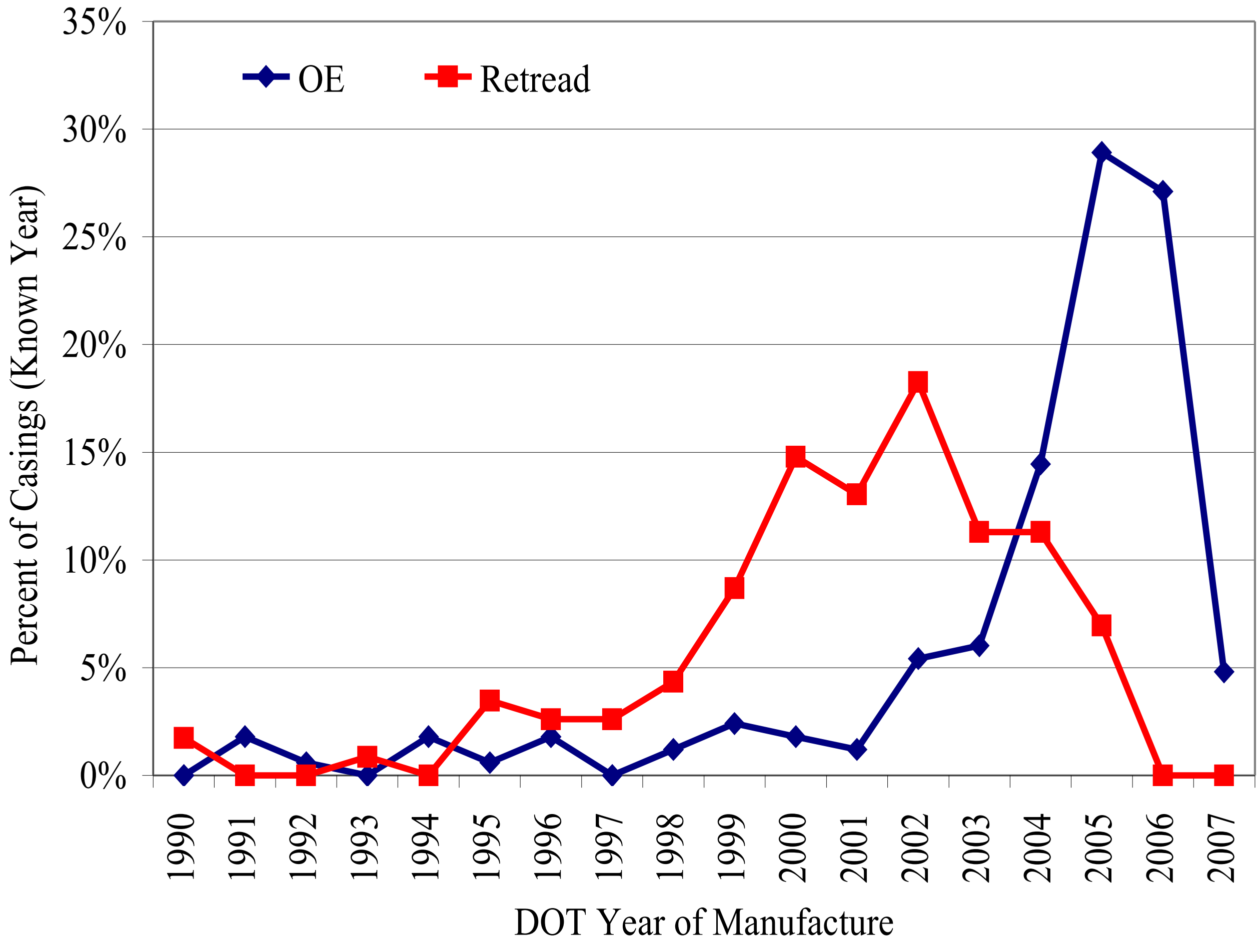
4 – Maintenance/Operational

5 – Manufacturing/Process

6 – Indeterminable

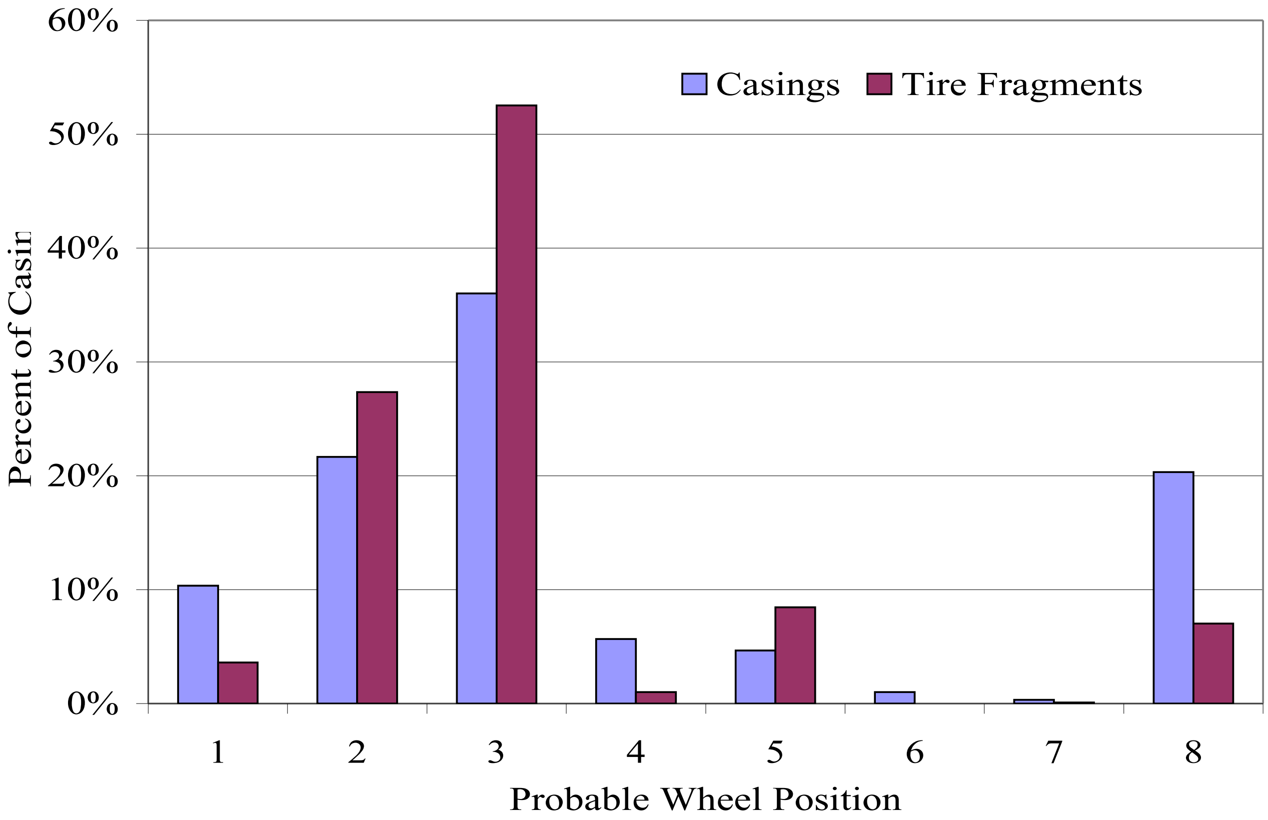
7 – Excessive Intra-Carcass Pressurization

Tire Year of Manufacture (OE or Retread Casings)



Collection Time Period: August-September 2007

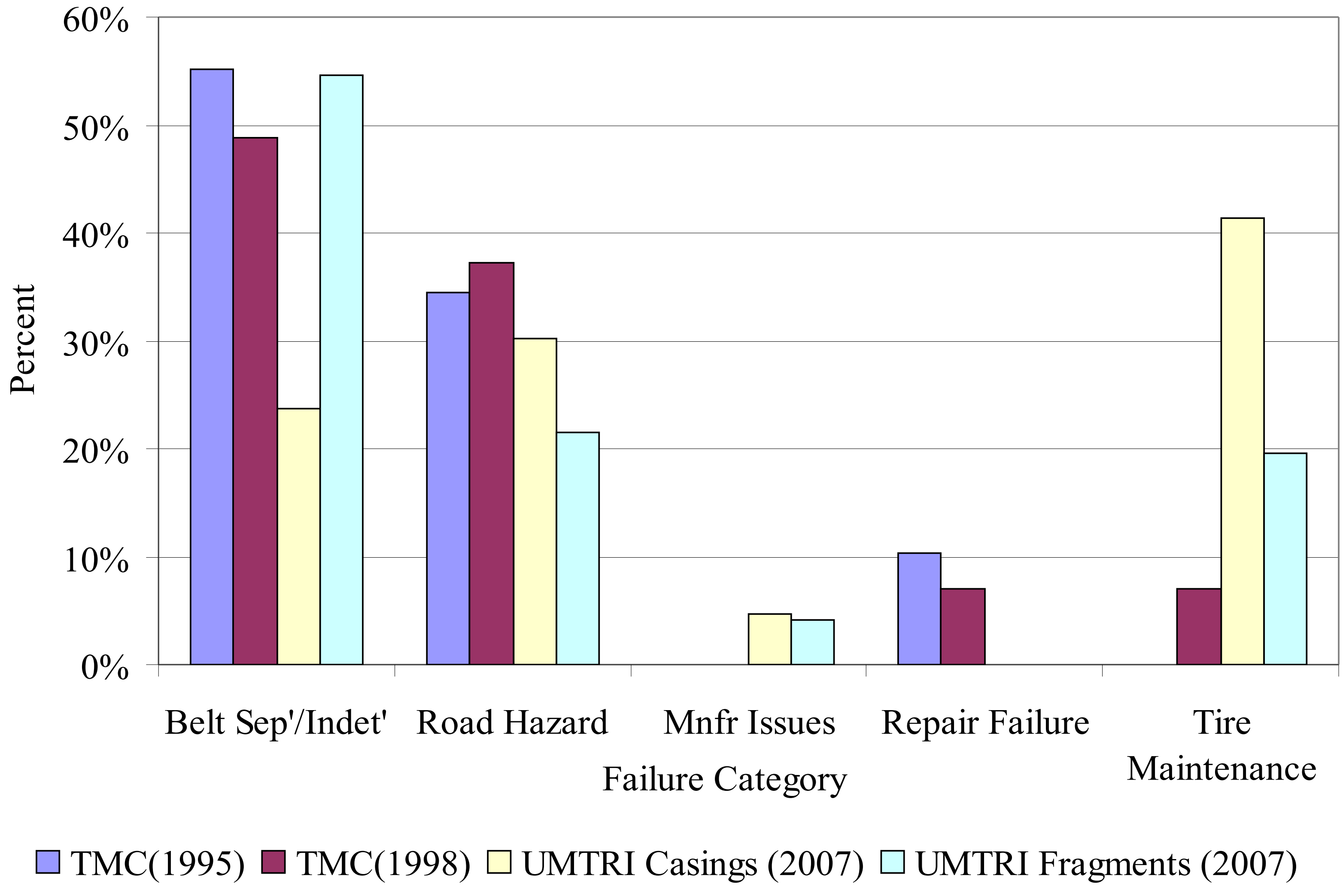
Casings and Tire Fragments Probable Wheel Position



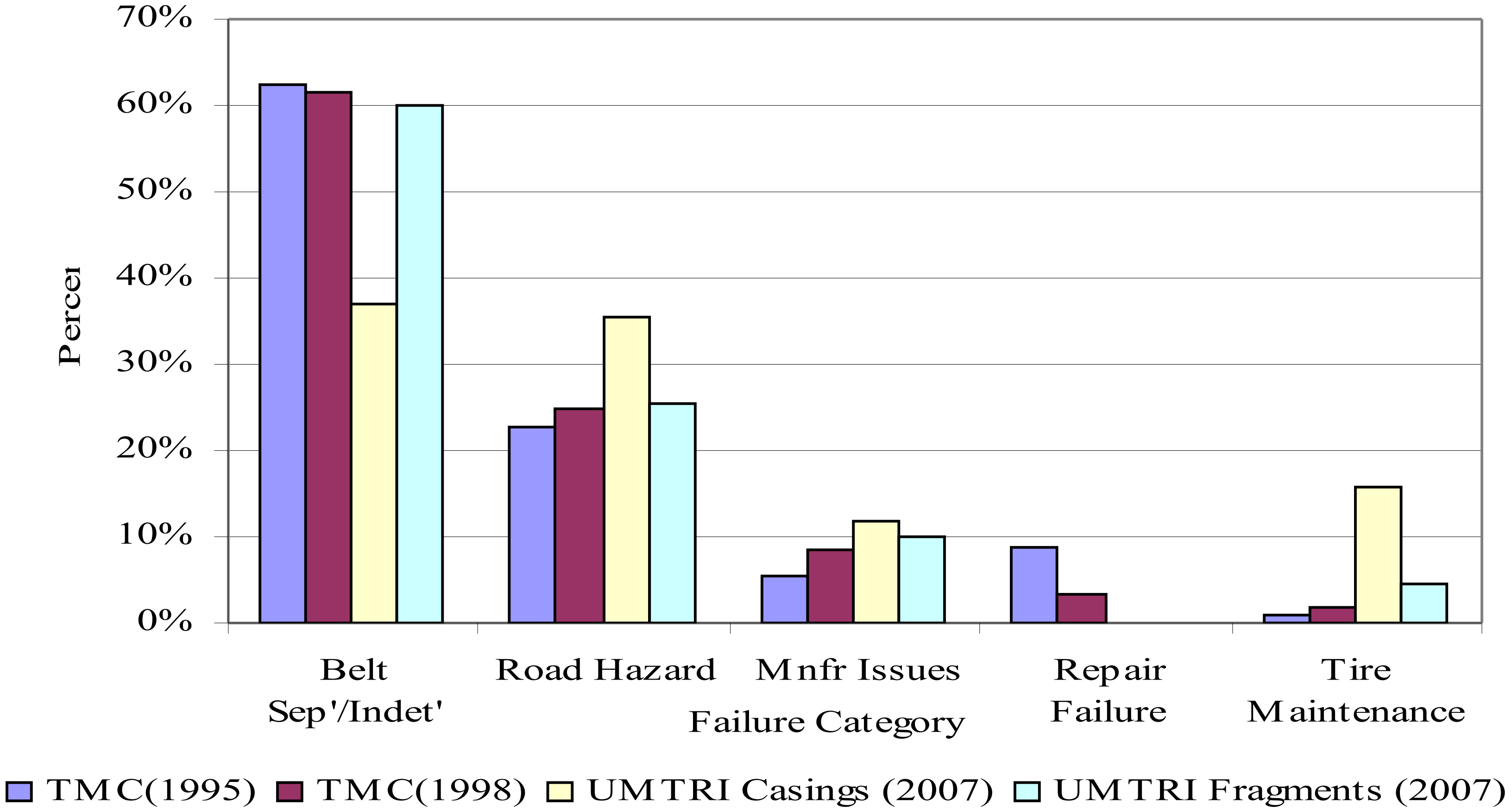
Wheel Position Categories:

1 = Steer
2 = Drive
3 = Trailer
4 = Steer or Trailer
5 = Drive or Trailer
6 = Steer or Drive
7 = Steer or Drive or Trailer
8 = Indeterminate

Failure Category Study Comparison OE/New Tires



Failure Category Study Comparison Retread Tires



Conclusions - Crash Data

- For truck/trailer vehicles, reported tire defects ranked second after brake system defects.
- Number of crashes with reported tire defects is small: 0.9% of all crashes (TIFA).
- Crashes with reported tire defects tend to occur in warmer months and are speed related.

Conclusions - Crash Data (Cont.)

- Truck/trailer crashes with reported tire defects tend to involve older vehicles.

- Rollover was more likely in trucks/trailers with reported tire defects.

- Loss of control was more likely in trucks with a reported tire defect located on a tractor steer axle.

Conclusions – Tire Casings

- Approximately 43% casings analyzed were retreads and 57% were original tread casings.
- Top 3 reasons casings were removed from service: road hazards (33%); maintenance/operational factors (29%) and overdeflected operation (14%).
- Slightly less than 10% of all casings showed any manufacturing or process-related conditions.
  - Of this number, most were retreading process issues, such as casing selection and repair, or tread rubber application issues.

Conclusions – Tire Debris

- Approximately 68% of tire fragments were from retread tires and 18% were from original tread tires. The remaining 14% could not be determined.
- Results are consistent with the estimated distribution of OE and retreads in service.
- Top 2 types of damage for debris fragments: road hazard (39%) and excessive heat (30%).

Conclusions - Overall

- Retreads were **not** overrepresented in the tire debris items collected.
- Results indicate the majority of tire debris collected was **not** a result of manufacturing or retreading process deficiencies.
- Truck/trailer vehicle crashes with a coded tire defect account for **less than 1%** of all crashes annually.
  - These crashes tend to have a higher incidence of rollover and loss of control than crashes with no reported tire defect.

Final report is available at:

Website:

www.nhtsa.gov

Thank You

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