

Risk of Serious Injury and Fatality in Tree and Pole Crashes:

Early Findings from NCHRP 17-43

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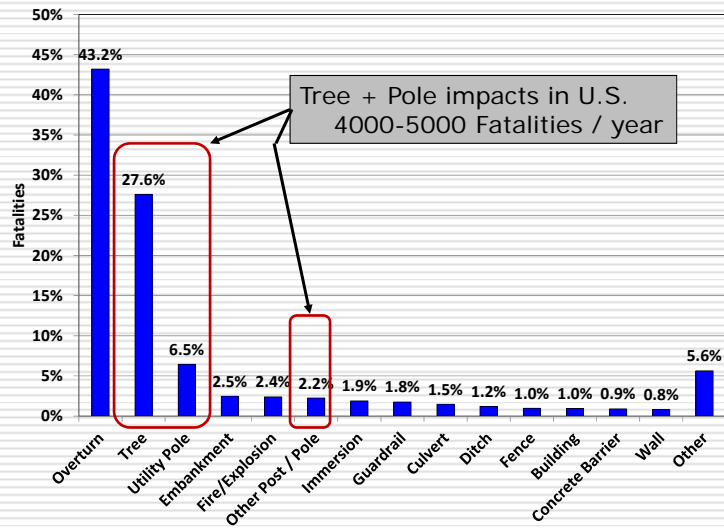
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Fatalities in Single-Vehicle Crashes

[FARS 2009, most harmful event, cars and light trucks only]



Objectives

- What are the characteristics of tree and pole crashes in the U.S.?

Approach

- National Automotive Sampling System/Crashworthiness Data System (NASS/CDS) 1997-2009
- NCHRP 17-22 dataset (1997-2001)
- Tree or Pole most harmful event
- Exclude rollovers
- Passenger Cars and Light Trucks only

Tree/Pole Data Set

(NASS/CDS 1997-2009)

	Cases	Weighted Cases	Annual Number
Crashes	6,065	2,448,462	188,343
Injury Crashes	5,049	1,301,639	100,126
Serious Injury Crashes	2,284	179,747	13,827
Fatal Crashes	763	39,991	3,076

NCHRP 17-22 Data Set

Tree and Pole Impacts only

	Cases	Weighted Cases
Crashes	259	147,572
Injury Crashes	239	98,767
Serious Injury Crashes	119	15,906
Fatal Crashes	40	4,323

Approach

Distribution of crashes and injury severity by:

- Delta-V
- Vehicle type
- Crash mode
- Lateral Offset
- Impact Speed
- Land use
- Highway type
- Belt use
- Body region
- Ejection
- PDOF
- Tree / Pole Condition
- Impact Location
- Seating Location
- Damage Extent
- Airbag Availability

Approach

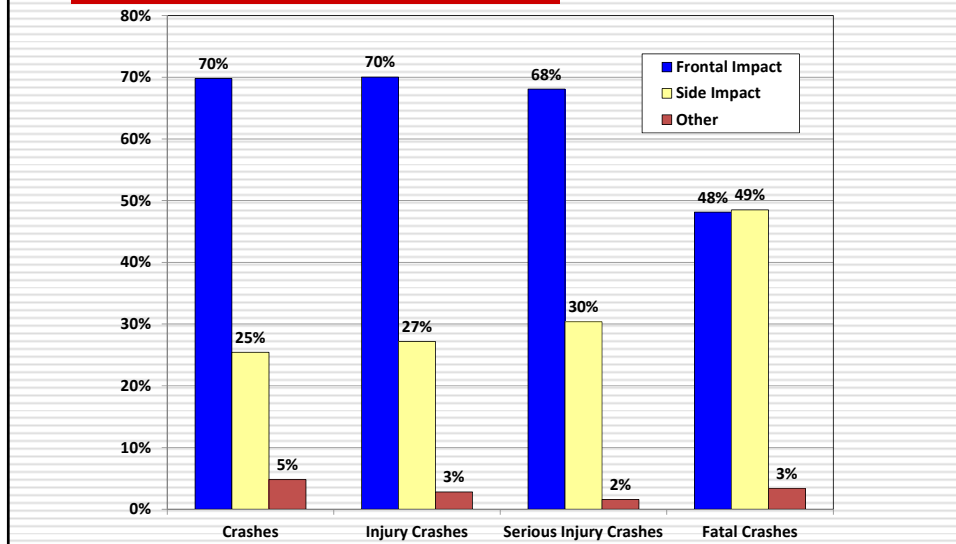
Distribution of crashes and injury severity by:

- | | |
|--|--|
| <input type="checkbox"/> Delta-V | <input type="checkbox"/> Body region |
| <input type="checkbox"/> Vehicle type | <input type="checkbox"/> Ejection |
| <input type="checkbox"/> Crash mode | <input type="checkbox"/> PDOF |
| <input type="checkbox"/> Lateral Offset | <input type="checkbox"/> Tree / Pole Condition |
| <input type="checkbox"/> Impact Speed | <input type="checkbox"/> Impact Location |
| <input type="checkbox"/> Land use | <input type="checkbox"/> Seating Location |
| <input type="checkbox"/> Highway type | <input type="checkbox"/> Damage Extent |
| <input type="checkbox"/> Belt use | <input type="checkbox"/> Airbag Availability |

What are the Characteristics
of Serious Tree/Pole
Crashes?

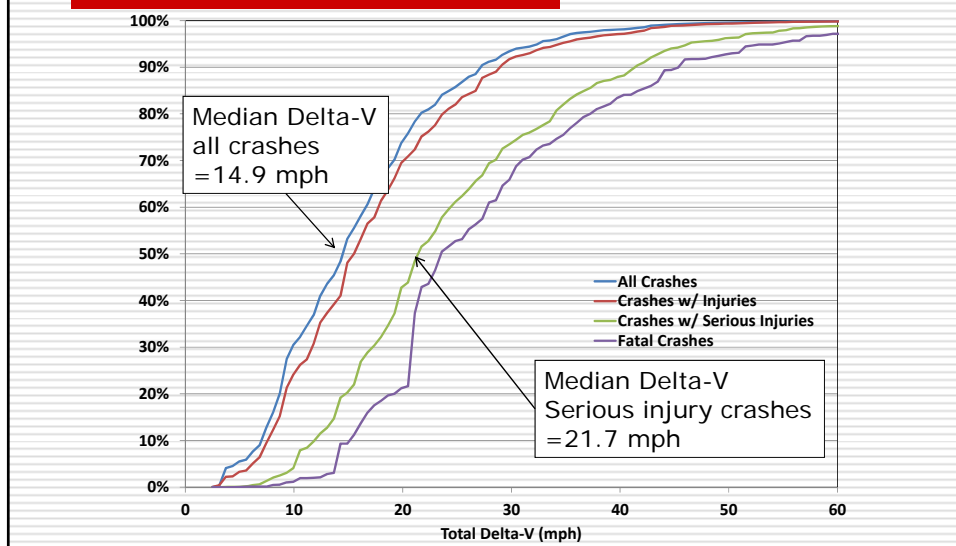
Frontal Impacts are Most Common... ... But Side Impacts are Most Lethal

(Distribution of Tree/Pole Crashes by Crash Mode, NASS/CDS 1997-2009)



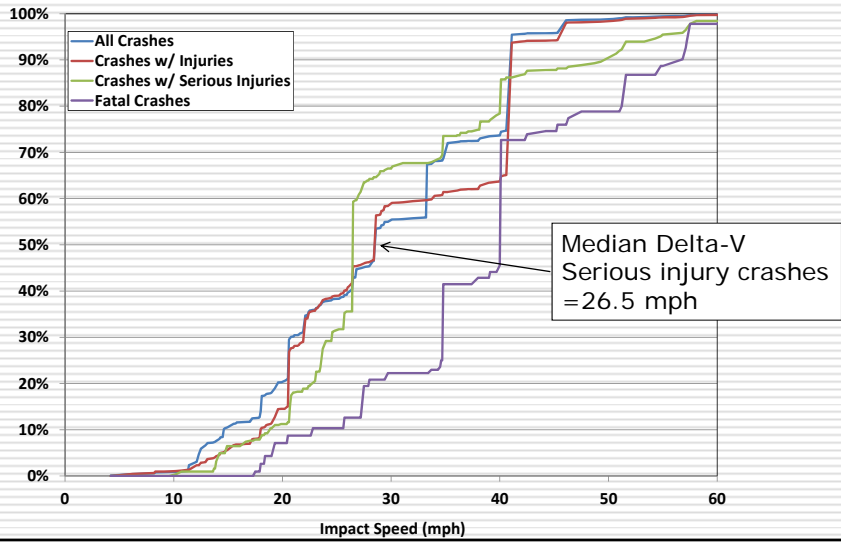
Tree/Pole Crashes by Total Delta-V

(NASS/CDS 1997-2008)



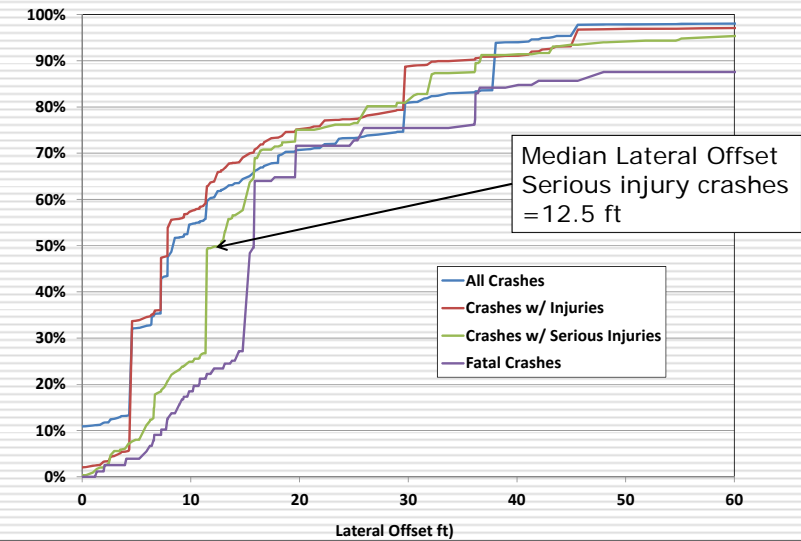
Tree/Pole Side Crashes by Impact Speed

(NCHRP 17-22)



Tree/Pole Side Crashes by Lateral Offset

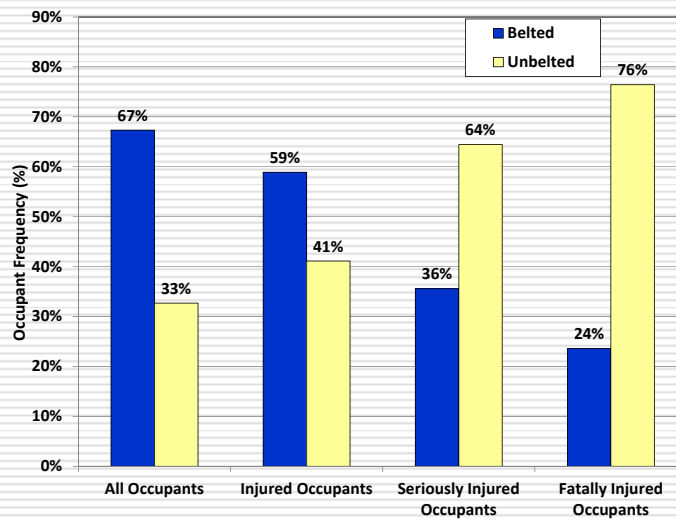
(NCHRP 17-22)



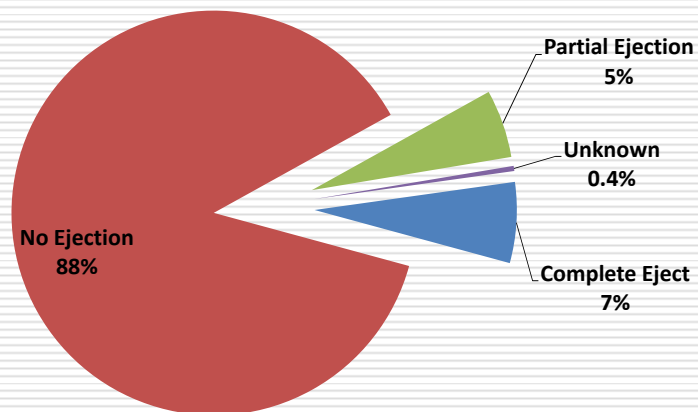
Who are the Seriously-Injured Occupants?

Tree/ Pole Crash Injuries by Restraint Use

(NASS/CDS 1997-2009)



Ejections in Serious Tree/Pole Crashes (NASS/CDS 1997-2008)



Preliminary Findings

- ❑ Approx. 5000 Tree and Pole fatalities/year
- ❑ 2/3 of Seriously Injured Occupants are unbelted
- ❑ 50% of Tree/Poles in Serious Crashes are within 12 feet (4 m) of road
- ❑ 50% of Serious Crashes under 26 mph (42 kph) at impact
- ❑ Side curtains beneficial in side impacts to tree / poles

Acknowledgements

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- NCHRP 17-43 Project Panel

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