

An Analysis
Of
15-passenger Van
Single Vehicle
Rollover Accidents

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Background Information

15-passenger vans were first introduced in the 1970's. Dodge, Ford and GM/Chevrolet have all produced these vans. From the time they were first introduced there have been handling and stability issues with these vans. The major problem is that the 15-passenger van has a high center of gravity. That center shifts even higher and rearward as more occupants board. The rearward shift increases the van's propensity to "fishtail" while the upward shift increases the likelihood of rollover. The combination of the lateral slide of the rear tires ("fishtailing") and the "top heavy" design can be devastating. Dangerous stability problems, not noticeable to average drivers, become all too apparent in emergency steering situations, such as swerving to avoid an obstacle or a sudden tire failure at highway speed. A van that is "fishtailing" is out of control. The more heavily loaded the van, the greater the gravity shift and the more likely it is to rollover, with tragic consequences¹.

Dodge ceased production of these vans in 2002. Ford and GM/Chevrolet still produce them. Their basic designs have not changed significantly since they were first introduced. The Ford van has a shorter wheelbase than the GM/Chevrolet (138" vs. 155"), a slightly higher center of gravity, a longer rear overhang and a higher percent weight on the rear axle. These basic differences tend to make the handling and stability problems of the Ford 15-passenger van somewhat worse than the GM/Chevrolet 15-passenger van. The Dodge 15-passenger van is the worst with the shortest wheelbase, the most narrow average track width, the longest rear overhang and the highest percent weight on the rear axle. More information comparing the three vans can be found on the American Center for Van and Tire Safety web site².

From 1997 through 2008 there were 1,223 fatalities of van occupants resulting from crashes involving 15-passenger vans. Of these 1,223 fatalities, 595 resulted from single vehicle rollover crashes of the 15-passenger vans³. Some accidents resulted in multiple fatalities and received national attention. NTSB and NHTSA conducted a number of accident investigations and issued recommendations.

Since 2001 numerous consumer safety advisories have been issued by NHTSA on these vans. In addition, NHTSA has conducted a number of studies and issued associated technical reports and notes concerning the rollover propensity and safety of these vans. NHTSA has also expanded a number of relevant Federal Motor Vehicle Safety Standards to extend coverage to these vans ... additionally, a number of safety features have been added to new 15-passenger vans ... including Electronic Stability Control and Tire Pressure Monitoring. NHTSA has also expanded the New Car Assessment program (NCAP) to include these vans. Further details on NHTSA's efforts can be found in their "15-Passenger Van Safety Actions Update" issued April, 2008.

Accident and fatality rates of 15-passenger vans have been declining since around 2003 (See Figure 1). This is likely the result of a number of factors including federal legislation limiting the use of these vans for schools and day cares, safety improvements in new vans, pressure from selected insurance companies for some organizations to limit or discontinue the use of these vans, and overall increased awareness of the dangers of these vans through the consumer advisories issued by NHTSA and a number of advocacy groups. Still there are over 500,000 of these vans in use today

¹ Safetyforum internet article (see www.safetyforum.com/passengervans) on 15-passenger vans dated August 24, 2007

² "A Comparison of 15-Passenger Vans - The Dangers of the Dodge 15-Passenger Van" - an article by American Center for Van & Tire Safety - dated January 2010.

³ Data taken from E-mail from Rajesh Subramanian (NHTSA) to R. Koehler dated 12/7/09.

that do not have the safety features of the new vans. Indeed, some of these older vans do not even have adequate occupant restraints in all positions. Accidents and fatalities continue ... In 2008 alone there were 64 fatalities of occupants of 15-passenger vans. Of those, 46 fatalities were in vans that rolled over... and, of those, 28 were killed in single vehicle rollover accidents.⁴ Single vehicle rollover accidents are the most preventable of all 15-passenger van accidents.

The purpose of this study was to gain as much information as possible about the types of vans involved in these accidents and to gain some understanding on the causes of these accidents or at least the circumstances

surrounding the accidents. This information could then be used in support of new vehicle safety legislation (State and/or Federal) ... in support of new or expanded NHTSA Federal Vehicle Safety Standards and/or safety related consumer alerts ... and to help direct public awareness activities by advocacy groups such as American Center for Van and Tire Safety.

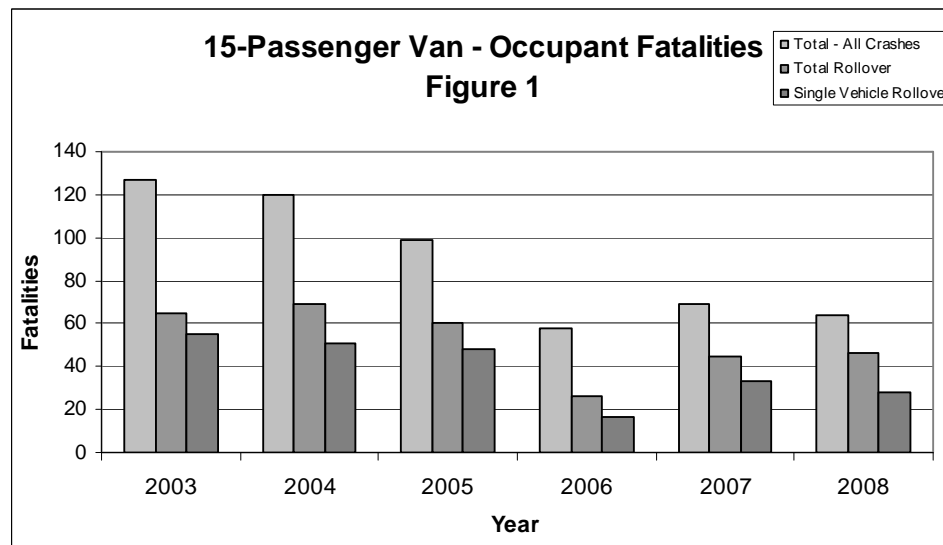
This study was originally issued in November 2008. This report is an update to that original study to add information on 15-passenger van accidents collected since the original issue date through the end of 2009.

Data Collection

In September, 2007 a series of "Google Alerts" were established in order to obtain any information of 15-passenger van accidents that found their way to the internet. The following "Google Alerts" were set up ...

- 15-Passenger vans
- 15-Passenger van accidents
- Church van accidents
- Van accidents
- Rollover accidents

Information came in daily ... it was primarily from a variety of newspapers and TV station websites. The information was reviewed and articles on 15-passenger vans were printed and retained. These were further reviewed and information on 15-passenger van single vehicle rollover accidents was entered into a spread sheet. In some cases additional information was requested and obtained from individuals that knew the circumstances of the accident ... in some cases, "first



⁴ Data taken from E-mail from Rajesh Subramanian (NHTSA) to R. Koehler dated 12/7/09.

responders” sent additional details and occasionally pictures of the overturned vans ... for some, the actual accident reports were obtained. Both fatal and non-fatal accidents were recorded and listed in the analysis.

Since this effort was begun in 2007 a total of fifty-four 15-passenger single vehicle rollover accidents have been identified and documented. A list of those accidents, with a brief description of each is attached. Note that the list does contain a couple of accidents that involved other vehicles. These accidents were considered significant and were listed for general information only ... they were not included in the single vehicle rollover analysis. A copy of the spreadsheet is also attached listing all the data that was used in the graphic representations included in this report.

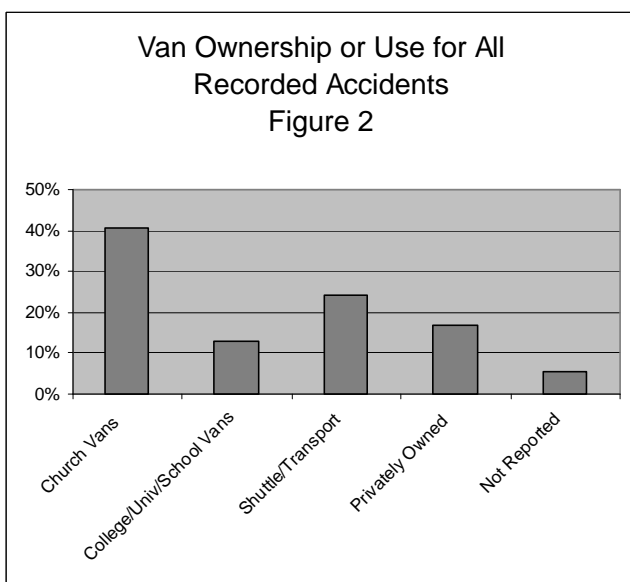
Incomplete information was obtained on seat belt/restraint use by the van occupants. Also, the make, model and year of the vans involved were not included in all cases. For each accident the number of van occupants was recorded.

Source information on each accident is available. It was too voluminous to include in this report.

Findings

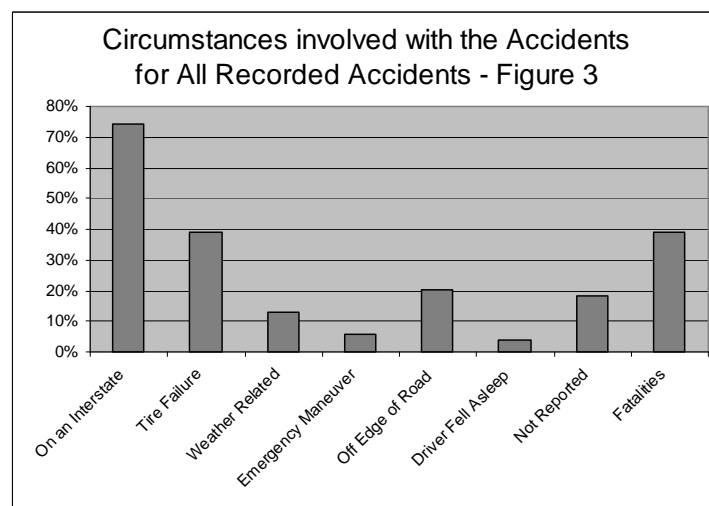
1. The data for all fifty-four of the 15-passenger van single vehicle rollover accidents reported can be summarized as follows....

The ownership or use of the vans is shown in Figure 2. Notice that a significant number (41%) of the accidents occur with Church vans. Shuttle/Transport vans account for 24% of the crashes ... followed by Privately owned vans at 17% and College/School vans at 13% of the accidents. No identification of ownership or use was reported for a small portion of the accidents.

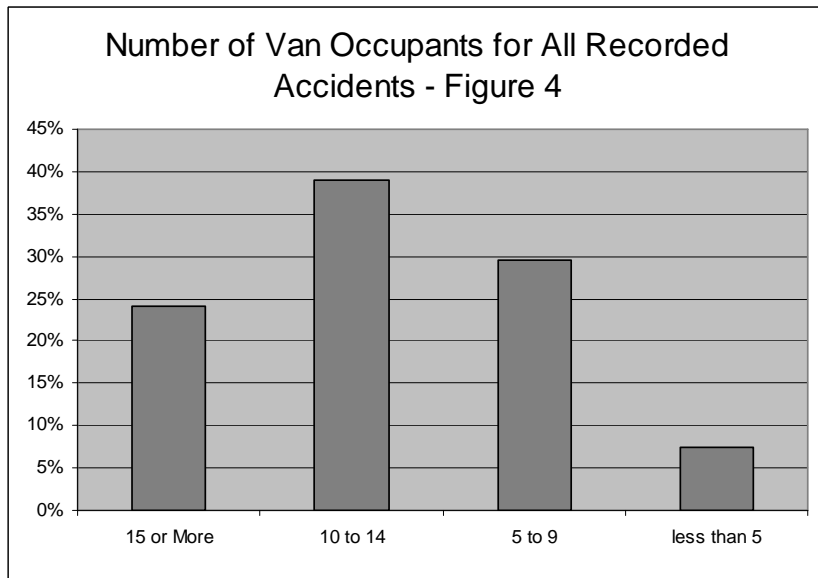


involved tire failure and 39% of the accidents resulted in at least one fatality ... a total of 37 fatalities were recorded. Losing control after accidentally going off the edge of the road accounted for 20% of the crashes. Weather related issues (snow, ice, rain, etc) were involved in 13%, while emergency maneuvers (such as swerving to miss another vehicle or an

Figure 3 shows the various circumstances involved in the accidents. Of all the 15-passenger van, single vehicle, rollover accidents recorded, 74% occurred when the van was on an interstate highway ... 39% of the accidents



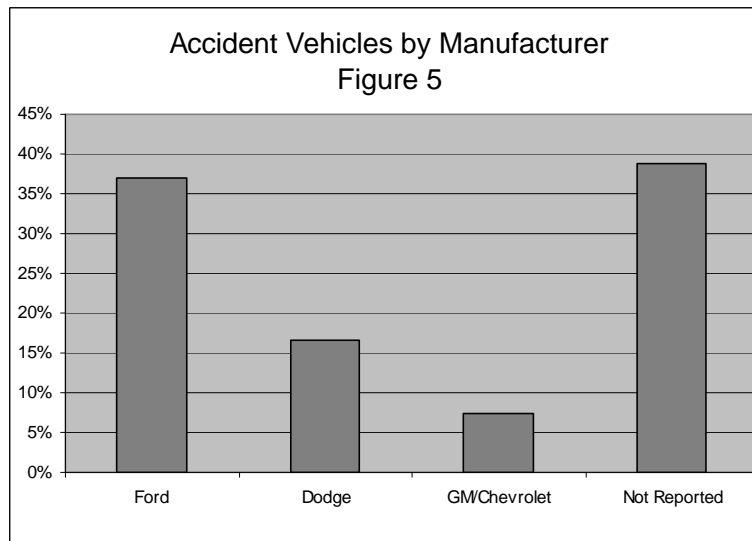
animal) caused 6%, and driver falling asleep accounted for 4% of the accidents. Approximately 19% of the accidents had no cause reported. There were no reports of alcohol or drug related accidents.



The number of van occupants in each accident was also recorded and is shown in Figure 4. In almost 25% of the accidents the van was filled to capacity or even overloaded. In approximately 40% of the accidents the van was loaded with 10 to 14 occupants. In total, in approximately 2/3 of the accidents there were 10 or more occupants in the van.

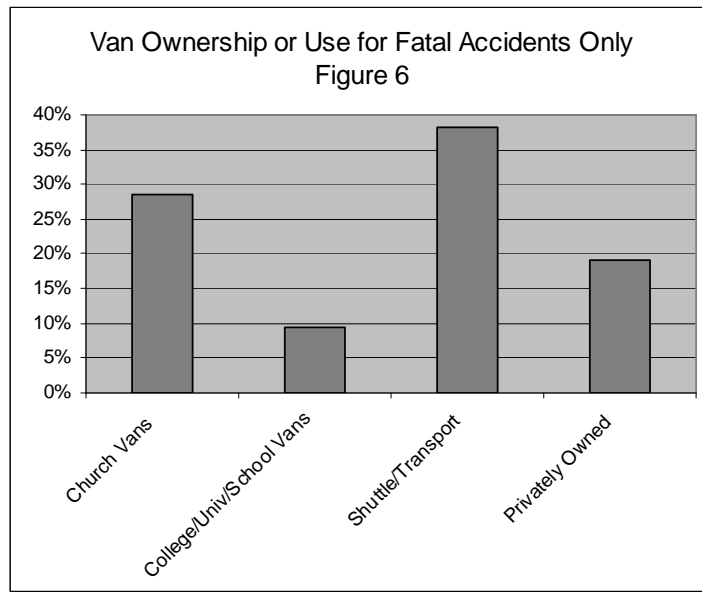
The van manufacturer was recorded in all cases where it was identified. This data is shown in Figure 5. Ford vans were identified in the accidents more than any other manufacturer. Dodge had the second most vans and GM/Chevrolet had the least. Ford vans were identified as being involved in approximately twice as many accidents as Dodge ... and five times as many as GM/Chevrolet.

This data can be compared with the national total number of vans as follows ... As of July 1, 2008 there were about 501,300 15-passenger vans registered in the US. Of these approximately 62% were Ford ... approximately 24% were Dodge ... and approximately 14% were GM/Chevrolet.⁵



⁵ Insurance Institute for Highway Safety web site – “Q&As: 15-passenger vans” – dated December 2009.

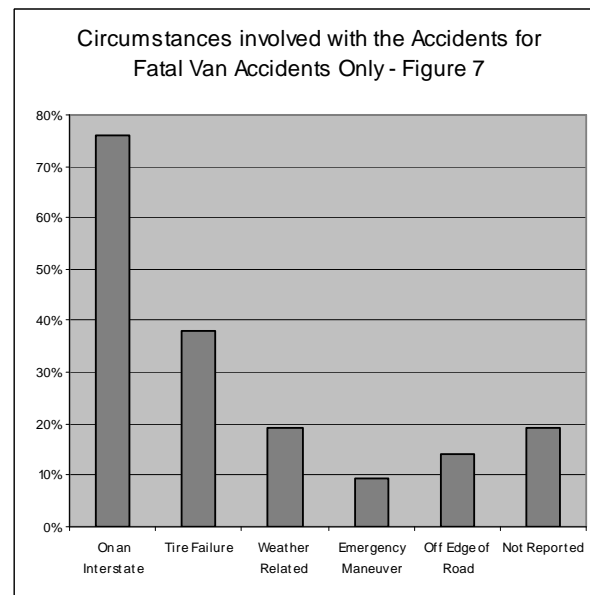
2. Considering only the fatal accidents recorded, the data can be summarized as follows ...



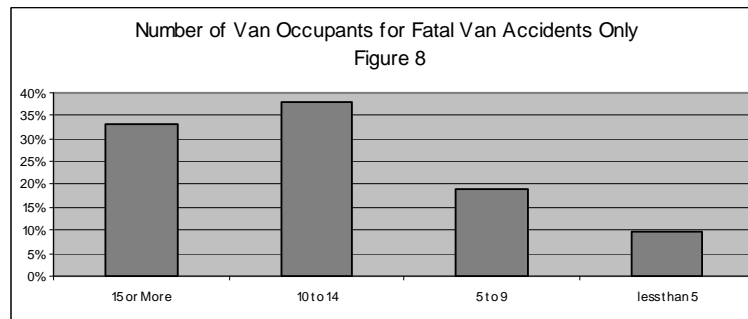
Twenty-one of the fifty-four 15-passenger van single vehicle rollover accidents recorded had one or more fatalities to van occupants. There were a total of 37 fatalities in these 21 fatal accidents for a fatality rate of approximately 1.75 deaths per fatal accident. The van ownership or use in these fatal accidents is shown in Figure 6. Note, that the highest percentage is Shuttle/Transport vans accounting for 38% of the fatal crashes (8 fatal crashes with 16 fatalities) ... followed closely by Church vans with 29% of the fatal accidents (6 fatal crashes and 13 fatalities) ... and then privately owned

vans. University/School vans were involved in the lowest percentage fatal accidents. Shuttle/Transport vans include farm worker shuttle vans, prison transfer vans, private airport shuttle vans and work crew shuttle vans.

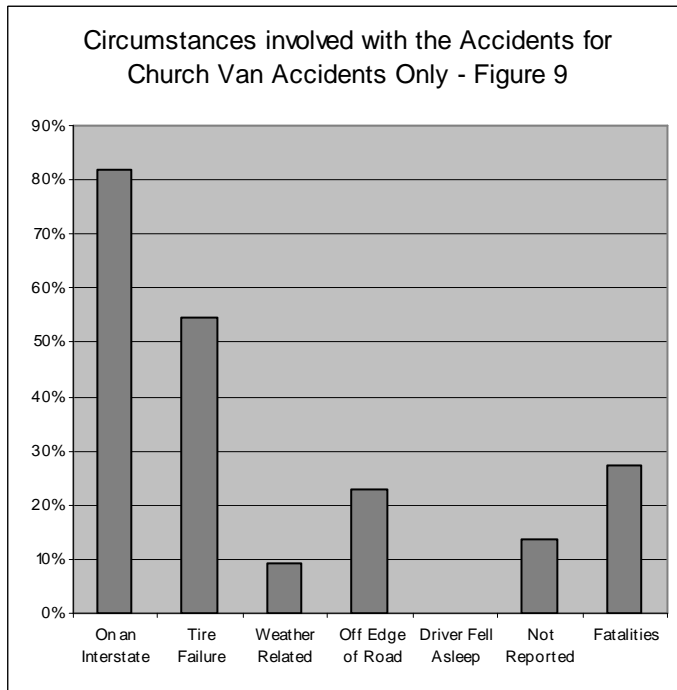
The circumstances involved in the recorded fatal accidents are shown in Figure 7. Note that over 75% of the accidents occurred on the interstate and 38% involved a tire failure. The left side (driver side) rear was the most common tire to fail. Due to the geometry of the van, this tire is the most heavily loaded.



The number of van occupants in the fatal rollover crashes were recorded and are shown in Figure 8. Note that over 70% of the vans involved in fatal crashes had 10 or more occupants.

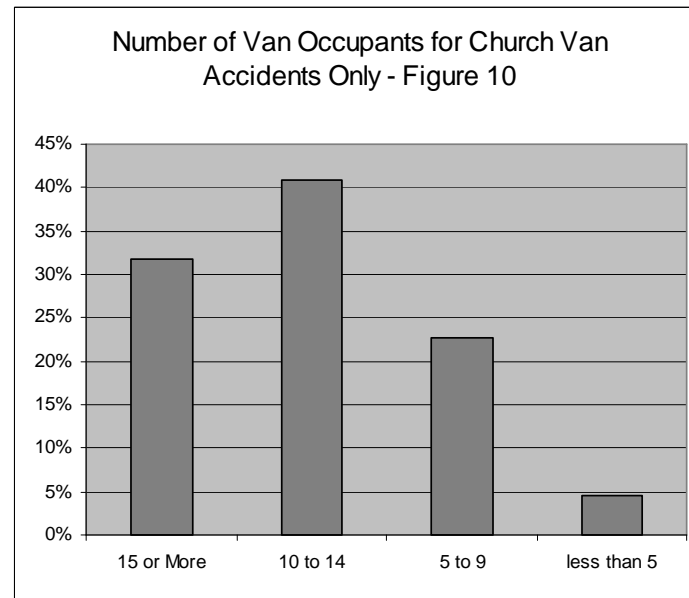


3. Considering only those accidents involving a “Church Van”, the data can be summarized as follows ...

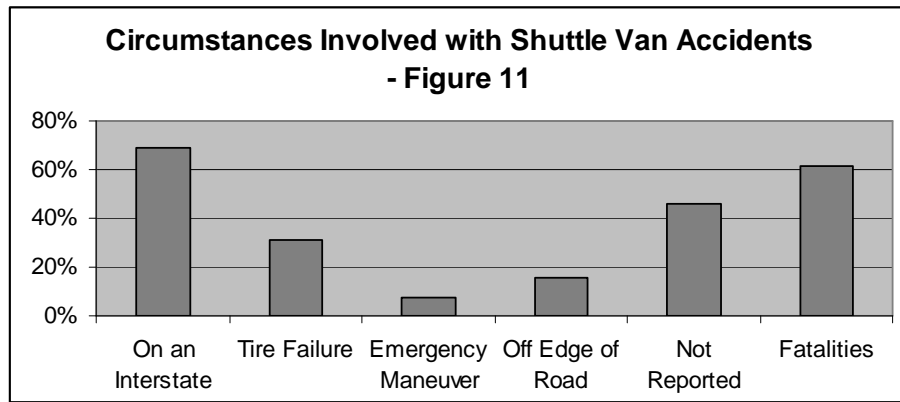


A total of twenty-two 15-passenger Church van single vehicle rollover accidents were recorded. The circumstances involved in these accidents are shown in Figure 9. Note that over 80% of the accidents occurred on the interstate and over 50% involved a tire failure. Again, the left side (driver side) rear was the most common tire to fail. There were fatalities in six, or over 25%, of all the 15-passenger church van single vehicle rollover crashes for total of 13 fatalities. This works out to a fatality rate of over 2 per fatal accident

The number of van occupants in Church van rollover crashes were recorded and are shown in Figure 10. Note that in approximately 3/4 of the accidents there were 10 or more occupants.



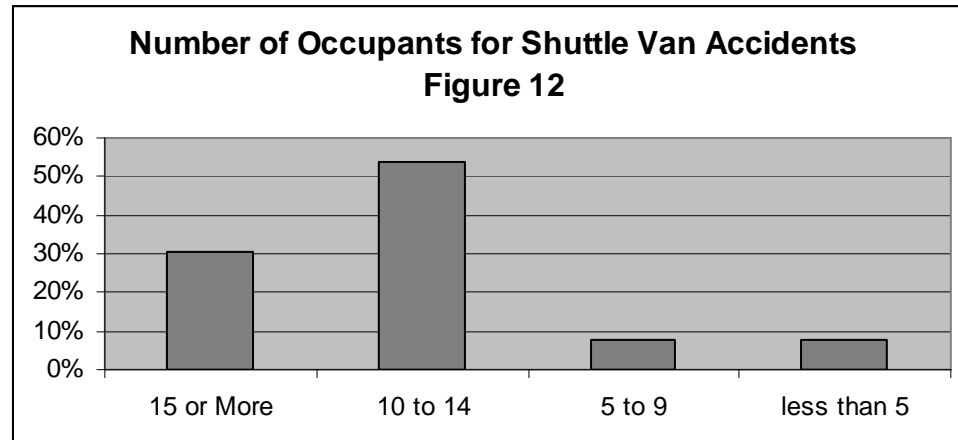
4. Considering only those accidents involving a “Shuttle/Transport Van”, the data can be summarized as follows ...



A total of thirteen 15-passenger shuttle van single vehicle rollover accidents were recorded. The circumstances involved in these accidents are shown in Figure 11. Note that nearly 70% of the accidents occurred on the interstate and over 30% involved a tire failure. Again, the left side (driver

side) rear was the most common tire to fail. There were fatalities in eight, or over 60%, of all the 15-passenger shuttle van single vehicle rollover crashes for total of 16 fatalities. This works out to a fatality rate of 2 per fatal accident.

The number of van occupants in Shuttle van rollover crashes were recorded and are shown in Figure 12. Note that in approximately 3/4 of the accidents there were 10 or more occupants



Conclusions

It is recognized that this study has not recorded all the 15-passenger van, single vehicle rollover accidents that have occurred since September, 2007. In fact, data from NHTSA/FARS for calendar year 2008 shows that there were 20 fatal 15-passenger van, single vehicle rollover accidents with a total of 28 occupant fatalities. This study found 8 fatal 15-passenger van single vehicle rollover accidents with a total of 11 occupant fatalities for calendar year 2008. Therefore, for calendar year 2008, the method of data collection used in this study picked up approximately 40% of the fatal 15-passenger single vehicle crashes. We believe this percentage is high enough to conclude that the results of the study are representative of the trends and tendencies in all 15-passenger van single vehicle rollover accidents.

Figure 13 shows the circumstances involved in 15-passenger van single vehicle crashes comparing all crashes with church van crashes, shuttle van crashes and all fatal 15-passenger van single vehicle rollover crashes. It is clear from the data recorded that an overwhelming percentage (over 70%) of these accidents occur on interstate highways ... in addition, approximately 40% of all the crashes result in fatalities of one or more van occupants. An high percentage (over 40%) of all the accidents involve "Church Vans".

"Shuttle Vans" account for approximately 25% of the accidents but have the highest percentage of fatal accidents ... over 60%.

One of the most alarming finding is that approximately 40% of all the accidents, and over 50% of "Church Van" accidents were either directly or indirectly the

result of tire failure ... in most cases a rear tire failure. This compares to only about 1% of all passenger vehicle fatal single vehicle rollover accidents being related to tire failures.⁶ The cause of these tire failures cannot, in most cases, be determined from the published accident reports ... possible causes could include ... improper tire pressure ... over aged tires ... excessive tread wear ... damage from a hazard in the road ... a manufacturer's defect in the tire ... etc. ... etc.

Clearly, if tire failures could be reduced then the number of 15-passenger van single vehicle rollover accidents and related fatalities would be reduced.

Related information concerning tire safety ...

1. In a 2005 NHTSA reported that they found that 74% of 15-passenger vans surveyed had one or more tires mis-inflated by 25% or more.⁷
2. A 2008 survey of 15-passenger vans in Knoxville, TN indicated that 40% of the vans surveyed had tires that were 6 or more years old ... and over 20% had tires that were 10 or more years old.⁸ Figure 14 shows a breakdown of that data between all the vans surveyed and

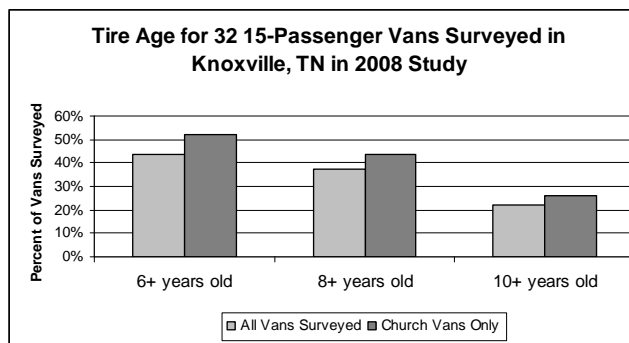
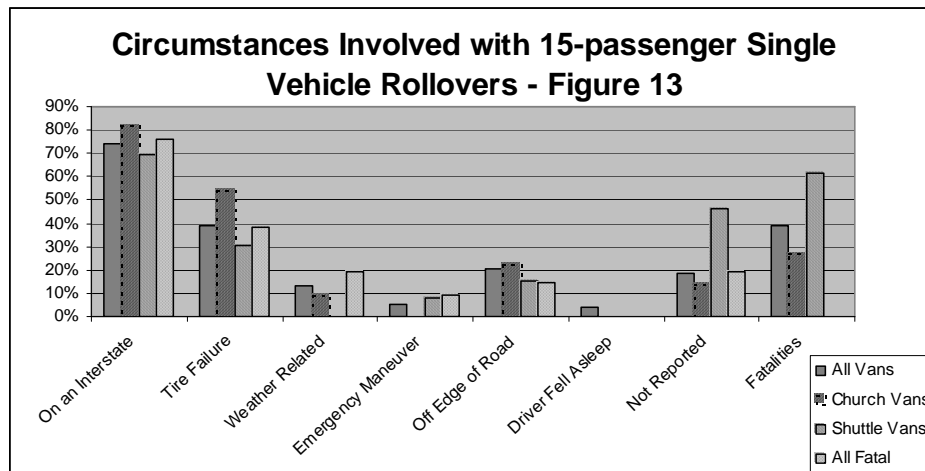


Figure 14

⁶ Data received from NHTSA's National Center for Statistics and Analysis at a meeting on December 10, 2007.

⁷ NHTSA Research Note - "12 & 15 Passenger Van Tire Pressure Study: Preliminary Results" - DOT HS 809 846 dated May 2005.

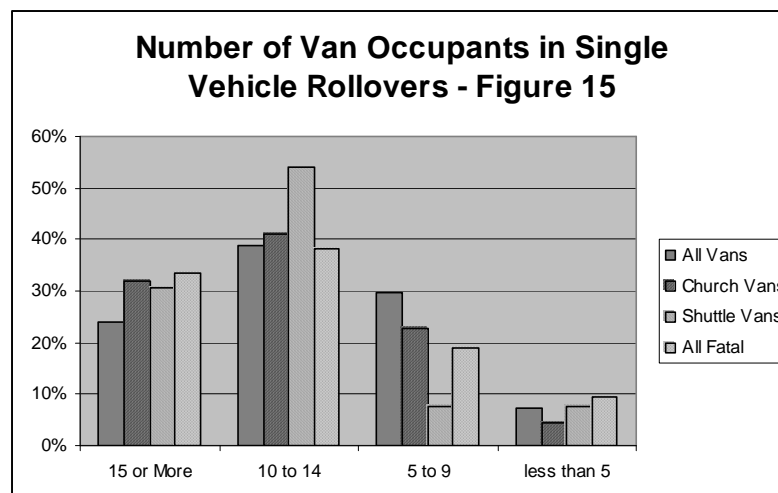
⁸ Study by R. Koehler & P. James - "Preliminary Study of 15-passenger Van Mileage and Tire Age in Knoxville, TN - dated April 2008.

only the church vans surveyed. Note that on church vans over 50% had tires that were 6 or more years old while over 25% had tires that were 10 or more years old.

3. In 2003 NHTSA issued a report on driver reactions to tire tread separations at interstate speeds as recorded in the National Advanced Driving Simulator.⁹ Based on the findings in that study, it is estimated that when drivers are presented with an unexpected tire failure ... that is a tread separation ... in vehicles with handling and stability characteristics similar to a 15-passenger van ... and with as few as 2 occupants in the van ... that over 50% of drivers will lose control of the vehicle ... with 15 occupants, as many as 80% will lose control of the vehicle. NHTSA's rollover "risk model" predicts that there is at least a 30% risk of rollover with 2 occupants ... and up to about 60% of rollover with 15 occupants, once a driver loses control of the van.¹⁰
4. Whenever tire manufacturing defects are identified the recall rates are frequently extremely low. According to NHTSA, tire recall completion rates are routinely much lower than recalls involving vehicles, equipment or child restraints. The 10-year historical average recall completion rate for tires is about 30 percent.¹¹
5. Additional facts concerning tire safety and tire "aging" are included on the attached "Fact Supporting the Need for an Awareness Program and Additional NHTSA Study and Rule Making Regarding Tire Aging" prepared and issued by the American Center for Van and Tire Safety in June 2008.

Considering the "Shuttle Vans" and high percentage of fatal crashes ... Many of the shuttle van crashes involved vans used to transport immigrant workers to and from places of employment such as farms, groves, poultry plants, etc.

Several of the cases involve "older" vans without sufficient occupant restraints and in some cases the vans are "overloaded". These crashes seem to get less coverage in the media than other type of van accidents and less detail is usually reported. In general these vans are more heavily loaded than other types of vans. Figure 15 shows the loading



of these vans as compared to church vans, all vans involved in single vehicle rollover crashes and all vans involved in fatal single vehicle rollover accidents. Almost 80% of the Shuttle Vans involved in single vehicle rollover crashes have 10 or more occupants while only slightly over 60% of all the vans involved in single vehicle rollovers have 10 or more occupants. According to a

⁹ NHTSA report – "Investigation of Driver Reactions to Tread Separation Scenarios in the National Advanced Driving Simulator (NADS)" – DOT HS 809 523 – dated January 2003

¹⁰ Calculated using "no tip" formula ... "New Car Assessment Program; Rollover Resistance; Final Rule" – dated October 14, 2007 – page 59291.

¹¹ Report by Safety Research & Strategies, Inc – "Tire Recalls and Tire Safety: The RFID Solution" – dated November 1, 2007

NHTSA Research Note¹² a 15-passenger van with 10 or more occupants has almost 3 times the rollover ratio in single vehicle crashes than those with less than 10 occupants.

Although this study did not obtain a great deal of information on seat belt/restraint use, it was noted that in many of the accidents the fatality victims were ejected from the vehicle. This was especially noted in the shuttle van accidents. This would indicate that many of them were not wearing seat belts/restraints. According to a report issued by NHTSA in May 2009, for calendar years 2003 through 2007, 80% of the fatally injured occupants of 15-passenger vans that rolled over were unrestrained¹³. In an earlier NHTSA report they showed that over 70% of unrestrained, fatally injured, occupants of 15-passenger vans in single vehicle rollover crashes were ejected¹⁴.

To further emphasize seat belt/restraint use, in 2008, approximately 72% of all 15-passenger van occupant fatalities occurred in rollover crashes. A major contributor to this extremely high rate is likely attributed to the apparent low use of seat belt/restraints in 15-passenger vans. In 2007, only 22% of the fatally injured occupants in 15-passenger van crashes that rolled over were restrained. In fact, during that same year only 31% of all the occupants in 15-passenger van crashes that rolled over were restrained. During that same year seat belt use in all passenger vehicles was estimated at 82%. If seat belt usage in 15-passenger vans can be increased, then it should follow that the number of fatalities in crashes involving rollover will be reduced.¹⁵

Recommendations

1. Continue to stress that all owners and operators of 15-passenger vans should read, understand and follow all the 15-Passenger Van Safety Guidelines issued by the American Center for Van and Tire Safety. A copy of those guidelines is attached. See the website, www.acfvats.org for more info on van and tire safety. Pay particular attention to the following ...
 - **Inspect the tires !** ... be sure they are the proper size and load rating ... have adequate tread ... are not over six years old ... are properly inflated ... and have no uneven wear, cracks or other damage. If tire safety can be improved the number of fatal single vehicle rollover accidents will be reduced.
Remember this study shows ...

A 15-Passenger Van + On the Interstate + A Tire Failure = Deadly Tragedy

- **Never overload the van !** ... NHTSA has reported that 15-passenger vans with more than 15 occupants have a 70% rollover ratio ! ... 15-passenger vans with less than 10 occupants have less than a 21% rollover ratio.¹⁶ Not overloading the van or reducing

¹² NHTSA Research Note "The Rollover Propensity of 15-Passenger Vans" dated April 2001 - Table 1 - page 3

¹³ NHTSA Traffic Safety Facts - DOT HS 811 143 - "Fatalities to Occupants of 15-Passenger Vans, 2003-2007" - issued May 2009.

¹⁴ NHTSA Technical Report - DOT HS 809 735 - "Analysis of Crashes Involving 15-Passenger Vans" - page 12 - Table 8 - issued May 2004.

¹⁵ Report issued by American Center for Van & Tire Safety - "Crashes and Related Fatalities to Occupants of 15-Passenger Vans - Calendar Year 2008" - issued in March 2010.

¹⁶ NHTSA Research Note "The Rollover Propensity of 15-Passenger Vans" dated April 2001 - Table 1 - page 3

the number of occupants will reduce the likelihood of rollover in an accident and thus reduce the number of fatalities.

- **Never allow the van to move unless everyone in properly belted/restrained ! ...** If the van does not have 3-point lap/shoulder restraints in every seating position, **do not** use the van for any extended trips at interstate speed. If seat belt usage in 15-passenger vans can be increased, then the number of fatalities in crashes involving rollover will be reduced.

2. Due to the high percentage of 15-passenger van single vehicle rollover accidents involving church vans, develop and implement an awareness program focused on churches. It is estimated that there are approximately 375,000 to 450,000 churches in the US. Although no data is available, if one estimates that 30% to 40% of all churches have 15-passenger vans, then there are approximately 110,000 to 180,000 church vans currently in use. This represents approximately 20% to 30% of all 15-passenger vans registered in the US. These vans are mostly considered low use with average annual mileage below 6,000 miles. Thus, tires will generally “age out” (exceed a safe age in years) before the tread wears out. In addition, most churches do not have an organized van maintenance program. If the safety of church vans can be improved then the number of single vehicle 15-passenger church van accidents will be reduced.
3. Continue to stress that if an organization or individual is considering the purchase of a 15-passenger van, they need to consider only those vans with the best safety features and highest NCAP star rating for rollover resistance. Currently, the 2009 GM/Chevrolet 15-passenger van has the most safety features and the highest (3 star) rollover resistance rating.
4. Urge NHTSA to complete their work on tire aging and to issue a report on findings and recommendations.
5. Urge NHTSA to add Tire Identification Numbers (TIN) to the FARS database to better understand to impact of tire failure in fatal accidents.
6. Urge NHTSA to require all tire manufacturers to print a clearly identifiable “Tire Expiration” date on the outside sidewall of all passenger vehicle tires.
7. Urge NHTSA to require all tire manufacturers to incorporate RFID chips in all passenger vehicle tires. This would allow easy tire identification in accidents so that tire information could be obtained and included in the FARS database. This would also provide a way to identify tires that have been recalled by the manufacturer ... thus reducing the likelihood of a defective tire being in use.

Attachments

<u>Description</u>	<u>Page</u>
• Listing & description of recorded 15-Passenger Van Rollover Accidents	13
• Spread sheets listing 15-Passenger Van Rollover Accidents	21
• Facts Sheet on Tire Aging	23
• 15-Passenger Van Safety Guidelines	26

A Number of 15-Passenger Van Rollover Accidents Since mid-2007

December 2, 2009 – Lamar County, AL

A 15-passenger church van traveling on a State highway with twelve occupants (ranging in age from 8 to 59 years old) ...went out of control and rolled ... cause not reported ... all occupants were taken to the hospital ... extent of injuries not reported ... No fatalities.

November 23, 2009 – Tampa, FL

A 1998 Ford 15-passenger van traveling on the interstate with sixteen occupants (15 children ranging in age from 11 to 15 and a 22 year old driver) ... they were members of a youth football and cheerleading organization ... the right rear tire failed ... the van went out of control ... struck a concrete barrier wall and rolled over ... all 16 occupants were taken to the hospital ... No fatalities.

November 12, 2009 – Baker City, OR

A 2002 Ford 15-passenger church van traveling on the interstate with sixteen occupants (ranging in age from 18 to 26) ... the van hit a patch of "black ice" ... slid off the road ... went out of control and rolled multiple times ... thirteen of the occupants were ejected ... all sixteen occupants were taken to the hospital ... Three fatalities (two died the day of the crash and the third about 10 days later).

October 10, 2009 – Jackson County, MN

A van (likely a 15-passenger van, unable to confirm) traveling on the interstate with eight members of a touring band from El Salvador ... Apparently, due to icy conditions the driver lost control ... the van slipped and rolled. At least one occupant was ejected. All eight band members were injured and taken to the hospital ... two were in critical condition and were air lifted to the hospital. No fatalities.

October 8, 2009 – Raleigh, NC

A 15-passenger church van traveling on the interstate with nine occupants ... A tire failed ... the van went out of control and rolled over ... all nine occupants were taken to the hospital ... No fatalities.

October 1, 2009 – Rensselaer, IN

A 1999 Chevrolet van (likely a 15-passenger van, unable to confirm) traveling on the interstate with six members of a touring gospel band ... A tire failed ... the van went out of control and rolled numerous times ... the one occupant not wearing a seat belt was ejected ... all six occupants were taken to the hospital ... No fatalities.

September 23, 2009 – Wichita, KS

A Ford 15-passenger county government transport van traveling on the interstate ... the van went out of control and rolled over ... cause not reported ... the one occupant (the driver) was taken to the hospital ... No fatalities.

September 9, 2009 – Hollister, MO

A Dodge 15-passenger church van traveling on a municipal road with seventeen occupants ... mostly junior high and high school students ... The van was going down a steep grade (approximately 19 percent grade) ... the van ran off the road and rolled over into a creek ... 16 of the 17 occupants were taken to the hospital ... No fatalities ... a few days later the 32-year-old driver that was being charged with "careless & imprudent driving and child endangerment" suffered a heart attack and died.

September 6, 2009 – Hattiesburg, MS

A 15-passenger private company prison transport van traveling on the interstate with three guards and nine inmates/prisoners ... the van went out of control and rolled over ... cause not reported ... all were taken to the hospital with a variety of injuries ... The 50 year old driver died as a result of the accident.

August 17, 2009 – Buffalo, NY

A 15-passenger church van traveling on the interstate with twelve occupants ... The driver apparently was traveling too fast for conditions and failed to negotiate an interchange ramp ... the van went out of control and rolled over ... seven of the twelve occupants were taken to the hospital ... No fatalities.

August 12, 2009 – Columbia, MO

A 2001 Dodge Ram 15-passenger van traveling on the interstate with thirteen occupants ... The driver apparently drifted off the edge of the pavement into the median and struck a guard post ... the driver lost control ... the van rolled over. A 49 year old woman was killed. Seven of the other occupants were sent to the hospital.

August 9, 2009 – Deep Gap, NC

A 1994 Dodge 15-passenger van traveling on a state highway with fourteen occupants ... The driver was exceeding a safe speed ... drifted off the edge of the pavement ... over-corrected ... and lost control ... the van rolled several times. Two occupants was ejected and killed. Eight were sent to the hospital.

July 26, 2009 – Charlotte County, FL

A 15-passenger church van traveling on the interstate with thirteen occupants ... The driver drifted off the edge of the pavement into the median ... over-corrected ... and lost control ... the van rolled several times. A two year old was ejected. 12 were sent to the hospital. The two year old was in critical condition. All survived.

July 17, 2009 – Paris, WI

A 15-passenger prison transportation van traveling on a state highway with ten occupants ... The driver veered off the road, possibly to avoid an animal, ... over-corrected ... and lost control ... the van rolled several times. One occupant was ejected and killed. Three others, including the driver, were sent to the hospital in critical condition.

June 22, 2009 – Coloma, MI

A Ford 15-passenger church van traveling on the interstate with ten occupants ... The driver became distracted "reaching for her purse on the floor" ... and lost control ... the van left the roadway onto the median ... hit a retaining cable ... and rolled several times. All ten occupants, ranging in age from 8 to 61 were taken to the hospital for treatment of a variety of injuries. No fatalities.

June 18, 2009 – Town & Country, MO

A 15-passenger church van traveling on the interstate with sixteen occupants (15 children and the driver) ... A tire failed ... the van went out of control and rolled over ... no fatalities.

June 14, 2009 – Blewett Pass, WA

A 15-passenger van traveling on a state highway with thirteen occupants ... A youth group consisting of 12 teenagers ranging in age from 16 to 19 plus an adult driver. The van drifted off the pavement and rolled down an embankment. All were taken to the hospital ... five suffered "some form of injury". No fatalities.

June 13, 2009 – Hesston, KS

A 1989 Dodge 15-passenger van traveling on the interstate with three occupants ... The right rear tire blew out ... the van went out of control, entered the median and rolled over ... one occupant was ejected and killed. None of the occupants were wearing seat belts.

June 7, 2009 – Fayetteville, NC

A 15-passenger van traveling on the interstate with ten occupants ... The driver drifted off the edge of the pavement ... apparently over-corrected ... and lost control ... the van rolled. All ten occupants were sent to the hospital. No fatalities.

June 3, 2009 – Texas Canyon, AZ

A 2004 Ford E-350 15-passenger van traveling on the interstate with seventeen occupants ... The left rear tire failed (tread separation) ... the driver lost control and the van rolled. Eleven occupants were ejected. Five occupants died at the scene ... a sixth occupant died of injuries at the hospital.

January 30, 2009 – Battle Creek, MI

A family owned 2001 Chevrolet Express 15-passenger van with 8 occupants traveling on a state road ... the van encountered "black ice" ... it slid and went out of control ... the van slid off the edge of the road and rolled several times ... there were no serious injuries and no fatalities.

January 29, 2009 – Hobe Sound, FL

A college owned Ford 15-passenger van with 5 occupants traveling on the interstate ... the van was towing a trailer ... the right rear tire lost its tread ... the van went out of control and rolled several times ... one was ejected ... there were no serious injuries and no fatalities.

January 7, 2009 – Wabash County, IN

A 1991 Ford 15-passenger van with 8 occupants traveling on a state road ... the van slid on ice on the road ... slid off the road ... struck a culver and rolled over ... no one was ejected ... one 16 year old passenger was injured ... no fatalities.

January 6, 2009 – Erie, PA

A University 12-passenger van with 8 occupants traveling on the interstate ... the driver fell asleep and drifted into the median ... the driver then overcorrected and lost control ... the van then hit some road signs and overturned ... Four were admitted to the hospital ... one in critical condition ... the other four were treated for minor injuries and released ... no fatalities.

December 27, 2008 – Lumberton, NC

A 2003 Ford 15-passenger van with 15 occupants traveling on the interstate ... the van drifted off the road ... the driver overcorrected and lost control ... the van then hit a guardrail and overturned ... two were ejected ... all occupants were taken to the hospital ... one fatality.

November 8, 2008 – Freeborn County, MN

A 2004 Ford 15-passenger van with 11 occupants traveling on the interstate ... the road was "icy" ... van slid sideways and went out of control ... it went into the median and rolled ... 10 occupants taken to the hospital ... one fatality.

October 26, 2008 – Gila Bend, AZ

A 1999 Ford 15-passenger shuttle van traveling on the interstate with 13 occupants ... the van went out of control and rolled over ... cause unknown ... only the driver and one occupant were wearing seat belts ... three occupants, not wearing seat belts, were killed ... seven others in the van were sent to area hospitals with serious injuries.

October 19, 2008 – Buckeye, AZ

A 15-passenger church van traveling on the highway with fifteen occupants ... A tire failed ... the van went out of control and rolled over ... eight occupants transported to area hospitals ... no fatalities.

September 15, 2008 – Walterboro, SC

A 2004 Ford 15-passenger church van traveling on the interstate with five occupants ... The left rear tire failed ... the van went out of control and rolled over ... three occupants were not wearing seat belts were ejected ... one of those ejected, a 38 year old woman was killed ... the four others in the van were sent to the hospital.

September 12, 2008 – Benson, AZ

A 15-passenger Dodge van traveling on the interstate with 12 occupants including eight high school cheerleaders and three coaches on their way to a football game ... van swerves to miss a dog on the highway ... van goes out of control and rolls over ... a car behind the van slows to avoid hitting the overturned van and is rear ended by a tractor-trailer killing two occupants of the car ... all 12 occupants of the van were taken to the hospital ... none of the van occupants were killed.

August 21, 2008 – Davidson County, NC

A 15-passenger van, pulling a camper, on the interstate ... van went out of control and rolled ... cause not reported ... the van's gas tank ruptured and burst into flames ... no fatalities.

August 16, 2008 – Pohatcong Twp., PA

A 15-passenger van traveling on the interstate ... van went out of control and rolled ... cause not reported ... after the accident both right side tires were flat ... don't know if this was the cause of the accident or the result of the accident ... 10 occupants taken to the hospital ... no fatalities.

August 15, 2008 – Tuscaloosa, AL

A church van traveling on the interstate with six occupants ... The left rear tire failed ... the van went out of control and rolled over ... the driver was killed, a 45 year old woman ... the five others in the van were sent to the hospital.

August 5, 2008 – Muskegon, MI

A 15-passenger van traveling on highway US 31 (similar to an interstate) in Muskegon Township with 15 occupants including some children ... the left rear tire failed ... the van went out of control and rolled over ... thirteen people were injured and sent to the emergency room ... one fatality ... a 56 year old woman who was ejected and died at the scene ... it's believed she was not wearing a seat belt. The van was a Ford E-350.

July 12, 2008 – Cave City, KY

A church van traveling on the interstate with 9 occupants most of which were children ... A rear tire failed ... the van went out of control and rolled over ... eight people were injured and sent to the emergency room ... no fatalities. The van was a 1994 Dodge.

June 30, 2008 – Pleasanton, TX

A church van traveling on the interstate with 11 occupants including teenagers ... The left rear tire failed ... the van went out of control and rolled over ... one teenager not wearing a seat belt was ejected ... nine people were injured and sent to the emergency room ... no fatalities.

June 23, 2008 – San Antonio, TX

A 15-passenger van on the interstate with 15 family members going on vacation ... A rear tire failed ... the van went out of control and rolled over ... all taken to the hospital ... two fatalities including a 15 year old boy ... the other 13 suffered non-fatal injuries. The van was a 1995 Ford Club Wagon.

June 14, 2008 – Boardman, OR

A 15-passenger van on the interstate with 15 farm workers plus the driver ... none were wearing seat belts ... The left rear tire failed (tread separation) ... the van went out of control and rolled over ... all taken to the hospital ... three were critically injured ... no fatalities. The van was a 1981 Dodge.

May 23, 2008 – Louisville, KY

A church van traveling on the interstate ... The left rear tire failed ... the van went out of control and rolled several times ... five elderly women sent to the hospital with injuries ... one was ejected ... no fatalities.

February 24, 2008 – Ocala, FL

A church van traveling on the interstate ... van went out of control and rolled ... cause not reported ... 12 occupants taken to the hospital ... no fatalities. The van was a Ford Econoline.

February 17, 2008 – North Mankato, MN

A church van traveling on the interstate ... high winds caused the van to veer off the road ... van went out of control and rolled over ... only minor injuries reported ... all (eight students and two adult leaders) were wearing seatbelts ... no fatalities.

January 12, 2008 – Hanover, NH

A 12-passenger van on the interstate ... van veered off the pavement ... van went out of control and rolled several times ... nine girls sent to the hospital ... they were all members of a collegiate track team ... three sustained serious injuries, including spinal cord, neck and internal injuries ... all were reportedly wearing seatbelts ... no fatalities. The van was a Ford E-350.

January 18, 2008 – Onawa, IA

A college van on the interstate towing a trailer ... driver attempts to take evasive action to miss a slowing or stopped car ... van skids ... trailer jackknifes ... van goes out of control and rolls ... van was carrying ten members of a college wrestling team and their two coaches ... one wrestler was partially ejected and killed ... he was not wearing a seatbelt ... all other occupants were wearing seatbelts and received only minor injuries. The van was a 2003 Ford.

January 15, 2008 – Phil Campbell, AL

A van transporting workers to place of employment ... the van was traveling on a state road ... van goes out of control and rolls ... eight injured and taken to the hospital ... one person ejected and killed. The van was a 1999 GMC.

January 12, 2008 – Bathurst, New Brunswick ... (not used in spreadsheet analysis)

A van transporting members of a boys high school basketball team ... Van was traveling on a two-lane highway ... road was likely somewhat snow covered and slick ... driver lost control ... van skidded into incoming traffic and was hit broadside by a tractor-trailer truck ... seven students and one adult were killed. The van was a 1997 Ford Club Wagon.

January 12, 2008 – Hartford, CT

A 15-passenger van traveling on the interstate ... van veered off the pavement, went out of control and rolled ... cause not reported ... nine occupants injured and hospitalized ... no fatalities. The van was a Ford Econoline E-350.

December 27, 2007 – Prince George, British Columbia

A 15-passenger van with 11 occupants traveling on the highway ... van attempts to pass a vehicle ... goes off edge of pavement, goes out of control and rolls ... all eleven occupants received minor injuries ... no fatalities.

December 1, 2007 – Wingate, IN

A college van carrying members of a hockey team traveling on a state highway ... slick roads with rain and sleet ... van slides, goes out of control and rolls over ... one student is killed and seven are injured.

November 8, 2007 – Round Rock, TX

A church van traveling on the interstate ... van went out of control and rolled ... cause not reported ... three occupants ... two were killed and one was injured.

October 24, 2007 – Alto Bonito, TX

An adult day care van carrying 10 passengers traveling on a U.S. Highway ... van strikes a car that had pulled out of a side road ... van goes out of control and rolls ... seven killed ... three were ejected ... at least four of the seven killed were not wearing seat belts.

October 21, 2007 – Muncie, IN

A church van traveling on the interstate ... The left rear tire failed ... the van went out of control and rolled several times ... five killed including two adults and three children ... eleven injured ... four of the five killed were ejected from the van ... The van was a Ford Club Wagon.

September 11, 2007 – Bishopville, SC

A church van traveling on the interstate ... The left rear tire failed ... the van went out of control and rolled several times ... van was carrying 16 people ... one killed and others injured ... several were ejected. The van was a 1992 Ford.

July 17, 2007 – Columbia, SC

A former church van carrying members of a youth girls softball team to a tournament ... van was traveling on the interstate ... left rear tire fails ... van goes out of control and rolls ... two adults and two children sustain injuries ... one ten year old is ejected and killed. All were reportedly wearing seat belts. The van was a 1994 Dodge Ram 350.

June 29, 2007 – Daytona Beach, FL

A church-affiliated day-care van was traveling on a county road ... pavement was wet ... van slid off the edge of the road, went out of control and rolled ... ten children injured and one six year old child killed.

April 29, 2007 – Lincoln, NE

A church van traveling on the interstate ... The left rear tire failed ... the van went out of control and rolled several times ... 18 students and 2 adults were riding in the van ... all were hospitalized, three in critical condition ... no fatalities.

November 25, 2006 – Fort Worth, TX

A church van traveling on the interstate ... a tire failed ... the van went out of control and rolled several times ... two adults and eight children injured ... no fatalities.

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Facts supporting the need for an awareness program and additional NHTSA study and rule making regarding tire “aging”

1. From 1994 through 2004, NHTSA estimates that about 400 fatalities, annually, may be attributed to tire failures of all types ... current data does not specify the number attributed to tire aging alone, but ... NHTSA states “we do know that tire aging is a significant factor in tire related safety”.¹⁷ In a 2008 Consumer Advisory, NHTSA recommends that motorists should follow their vehicle and tire manufacturer’s recommendations concerning replacement of tires due to age. NHTSA goes on to state that “Old tires are also subject to greater stress, which increases the likelihood of catastrophic failure”.¹⁸
2. NHTSA has determined that thermo-oxidative degradation (“aging”) of tires is accelerated with higher temperatures and is a contributing factor for tire failures, such as tread separation.¹⁹
3. Traditionally, the end of service life of tires is independent of tire age and is defined as the point when the tread wears down to 2/32 inch. However, tires on some vehicles can be in service for many years and yet accumulate very few miles resulting in little or, in the case of full-size spare tires, no wear. NHTSA estimates that 50 percent of light trucks will still be in service after 14 years of age, and 25 percent after 20 years of age. This prompts concerns about the use of full-size spare tires in these vehicles as few owners replace their full-size spare when replacing the in-service tires.²⁰
4. In testing actual “aged” tires, NHTSA has found that ... “An evaluation of the tire and rubber material properties in different areas of the tires confirmed that the tire rubber compounds and the materials that bond them experienced thermo-oxidative degradation during service due to their heat and oxygen exposure over time as well as from service related fatigue. The tires experienced a reduction in peel (adhesion) strength between the steel belts, an increase in hardness of most rubber components, a loss of the rubber components’ ability to stretch, increased crack growth rates, and a reduction in cycles to failure in fatigue tests”.²¹
5. NHTSA’s field study showed structural degradation of tires in terms of internal cracks and separations resulting from the tires being used in service. This internal degradation and damage was nearly impossible to detect from a visual inspection alone.²²

¹⁷ NHTSA Research report to Congress on Tire Aging (DOT HS 810 799) dated August 2007.

¹⁸ NHTSA Consumer Advisory: Motorists Urged to Check Tires Before Summer Trips – dated June 2, 2008.

¹⁹ NHTSA Research report to Congress on Tire Aging (DOT HS 810 799) dated August 2007.

²⁰ Id.

²¹ Id.

²² Id.

6. Vehicle manufacturers DaimlerChrysler, Ford, VW/Audi and BMW all recommend a maximum six year service life (from date of manufacture) for tires on their vehicles ... including the spare.²³
7. In a recent study conducted by North Carolina State University, only 4% of those surveyed identified “aging” as a potential tire problem.²⁴
8. Spare tires, tires in storage or on a shelf prior to use, or tires that are infrequently used on trailers or recreational vehicles, run the risk of premature aging and may be unsafe even though they may have sufficient amounts of tread or appear “new”.²⁵
9. A study by Kalsher, Wogalter, Lim and Laughery (2005) suggested that a substantial percentage (26%) of people thought that tires could last 10 years or more. This indicates at the very least, some incomplete consumer knowledge about tire aging.²⁶
10. In the N.C.State study, approximately half (44.9%) of the participants reported that they have not read the owner’s manual for the vehicle they drive. Of those who reported reading the owner’s manual, 63.7% reported that they have read less than 50% of the manual.²⁷
11. According to NHTSA approximately 1% of vehicle fatalities are related to tire issues, while in the case of 15-passenger vans, approximately 11% of fatalities are related to tire issues.²⁸
12. Tires, like any other rubber product, have a limited service life regardless of tread depth and use. The dangers of “aged” tires is a little known problem outside of the industry and one that is likely the cause of a significant number of tread separation problems. “Aged” tires are often unsuspectingly put into service after having served as a spare, stored in garages or warehouses, or simply used on a vehicle that is infrequently driven. In many instances these tires show no visible sign of deterioration, and absent any visible indicators, tires with adequate tread depth are likely to be put into service regardless of age.²⁹
13. Safety Research & Strategies, Inc has documented 159 incidents in which tires that were six years old or older experienced tread/belt separations. These incidents were the cause of 128 fatalities and 168 serious injuries.³⁰ In a previous study at least a third of these type of incidents involved “aged” spare tires. In most cases these tires were put into service shortly before the accident.³¹
14. According to a 2008 survey of church and university 15-passenger vans in the Knoxville TN area, 40% of the vans surveyed had tires that were six or more years old ... over 20% of the

²³ NHTSA Research report to Congress on Tire Aging (DOT HS 810 799) dated August 2007.

²⁴ N.C.State University Dept of Psychology “People Do Not Identify Tire Aging as a Safety Hazard” by Jennifer Cowley, Soyun Kim & Michael Wogalter.

²⁵ Id.

²⁶ Id.

²⁷ Id.

²⁸ Data received from NHTSA’s National Center for Statistics and Analysis at a meeting on December 10, 2007.

²⁹ Safety Research & Strategies – “Tires: Aging Dangerously” dated 2006.

³⁰ Safety Research & Strategies letter to NHTSA Nicole Nason dated June 2, 2008.

³¹ Safety Research & Strategies letter to NHTSA Nicole Nason dated December 20, 2006.

vans surveyed had tires that were ten or more years old.³² This is likely attributed to the relatively low annual use rate coupled with the belief, by most, that tire life is strictly a function of remaining tread depth.

15. The accident that resulted in the death of Alexis James in July, 2007 was initiated by the failure (tread separation) of the left rear tire on a 1994 15-passenger van. The tire has been shown to be 13 years old and was unwittingly installed by a tire dealership/shop approximately one month prior to the accident. The accident report stated that from the remaining tire remnants, it appeared to be in like new condition. The tire was likely the original spare tire.

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³² Study by R.Koehler & P.James – “Preliminary Study of 15-passenger Van Mileage and Tire Age in Knoxville, Tennessee” – dated April, 2008.

15-Passenger Van Safety Guidelines

1. When a 15-passenger van is not full, passengers are to sit in seats that are in front of the rear axle.
2. Never allow more than 15 people to ride in a 15-passenger van.
3. Require all passengers and the driver to wear proper safety restraints (seat belts - preferably 3-point lap/shoulder belts) any time the van is in motion. Inspect seat belts regularly ... replace any missing, broken or damaged belts and/or buckles.
4. Inspect the tires, including the spare ... determine the date of manufacture of each tire from the DOT code (may only be on the inboard sidewall). The DOT code will end with either 3 numbers or 4 numbers ... if three numbers, the tire was manufactured in the 90's. the last number is the year and the first two are the week in that year ... example "168" would be the 16th week of 1998. If four numbers, the tire was manufactured in 2000 or later ... the first two numbers are the week and the last two numbers are the year ... example "2303" would be the 23rd week of 2003.
5. Replace all tires that are more than six years old. It is critical to remember that low mileage doesn't mean tires are safe. Tires deteriorate with time whether they are used or not ... And, unfortunately, dangerously deteriorated tires cannot always be detected by visual inspection alone. When buying new tires be sure to get the date of manufacture of each tire. If they are more than a year old, do not buy them. Remember they have a six year life from the date of manufacture not from the date they are installed on your van.
6. Be sure all tires are the proper size and load rating for the van. Recommended tire size and load rating should be in the owner's manual.
7. Inspect the tires before each use. Examine tires for uneven wear, cracks, and other damage. Replace any damaged tires.
8. Check tire pressure before each use. Beware ! ... required front and back tire pressures may be very different and are likely higher than required for car tires ... typically van tires must be inflated to 50 lbs. for the front tires and 80 lbs. in the rear tires. The manufacturer's recommended pressure is usually provided on the driver's doorsill or in the owner's manual.
9. Do not overload the van. See the owner's manual for maximum allowable total weight of passengers and cargo.
10. Do not strap any cargo onto the roof or back of the van.
11. Do not tow anything behind the van.
12. Be certain the driver has a valid driver's license for the state where they reside (a commercial driver's license is preferred). Be aware that van drivers need additional training since these vans handle differently than other vehicles, especially when fully loaded. Allow no one under the age of 21 to drive the van. Select one or two drivers to drive the van on a regular basis. Insist that a new driver get experience driving the van alone before driving with others in the van. Remember a 15-passenger van is substantially longer and wider than a car, thus it ...
 - Requires more space and additional reliance on the side-view mirrors for changing lanes.
 - Does not respond as well to abrupt steering maneuvers ... such as might occur with a blowout or dropping off the edge of the pavement.
 - Requires additional braking time.
13. Limit drive time to 8 hours per driver per 24 hours. Ban driving from midnight to 6 a.m. ... the van is dangerous enough without fatigue and poor visibility.
14. Be absolutely certain the driver is not under the influence of alcohol or drugs.

15. The driver is to be well rested and attentive to driving. Prohibit use of a cell phone by the driver while the van is in motion. Limit conversation with other passengers.
16. Drive at a safe speed based on driving conditions ... never more than the speed limit ... and with a maximum of 60 mph regardless of the conditions and speed limit. Always slow down if the roads are wet or icy.
17. Keep the gas tank as full as practically possible. A full tank of gas lowers the center of gravity and reduces the risk of rollover.
18. Remove the last row of seating. Do not stow cargo in the van any higher than the bench level of the seats.

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