



**15-Passenger Van Safety
Frequently Asked Questions
&
Recommendations for Safe
Operation**

Mississippi Institutions of Higher
Learning
Safety and Loss Control

FY 2006

15-Passenger Van Safety Frequently Asked Questions & Recommendations for Safe Operation

The question is often asked, “why are we so concerned about 15-passenger vans?” Two reasons are paramount, among others: first is the documented fact that these vehicles have demonstrated a propensity to be involved in roll-over crashes, with a 70% fatality rate. The second reason is the rather precious cargo (human lives) that is typically on board, and the amount of this cargo. When something goes wrong, it can go wrong in a big way.

“Where do we get our information?”, is usually the second question. The standard bearer in this issue is the National Highway Traffic Safety Administration (NHTSA), which was created in Highway Safety Act of 1970. The NHTSA is responsible for reducing deaths, injuries, and economic losses due to traffic crashes. This is accomplished through research into traffic conditions, driver behavior and vehicle design and then promoting ideas and strategies to improve overall safety on American roads.

A 2004 NHTSA study (and 49 page report) explored the relationship between vehicle occupancy and several other variables in the NHTSA Fatality Analysis and Reporting System (FARS) database and a 15-passenger van's risk of rollover. The study examines statistics on fatal crashes involving 15-passenger vans from 1990 to 2002. The study also constructs a logistic regression model to model the effects of various factors, most importantly occupancy level, on the risk of rollover. The model is constructed using data from 1994 to 2001 on police-reported motor vehicle crashes in five states that are part of NHTSA's State Data System (SDS).

The data show that between 1990 and 2002, there were 1,576 15-passenger vans involved in fatal crashes that resulted in 1,111 fatalities to occupants of such vans. Of these, 657 vans were in fatal, single vehicle crashes, of which 349 rolled over. In 450 of these vans, there was at least one fatality, totaling up to 684 occupant fatalities in single-vehicle crashes. The majority of fatally injured van occupants were not wearing seat belts. Only 14 percent of the fatally injured were restrained. Analysis of data from NHTSA's SDS reveals that the rate of rollover observed for 15-passenger vans that are loaded above half their designed seating capacity is 2.2 times the rate observed for vans loaded to or below half their capacity. The odds of a rollover for a 15-passenger van at its designated seating capacity is more than five times the odds of a rollover when the driver is the only occupant in the van.

The agency also performed computer modeling to assess the handling of these vehicles. The modeling predicted understeer for 15-passenger vans when lightly loaded, similar to minivan behavior. However, when heavily loaded, it predicted understeer at low lateral acceleration, but oversteer at higher lateral accelerations. This transition to oversteer may pose safety problems for drivers who are unfamiliar with this characteristic. Loading 15-passenger vans to gross vehicle weight (GVW) also moved center of gravity rearward, increasing vertical load on rear tires.

What makes 15-passenger vans so dangerous? Begin answering this by recognizing that these vans were originally designed to haul cargo - not people. Therefore, many of the safety features associated with typical passenger vehicles (like mini-vans, or busses) was omitted. In fact, 15-passenger vans are more like trucks, while mini-vans are more like cars. They have truck chassis, truck suspensions, truck tires and truck engines. Mini-vans are built on car chassis, with car suspensions and tires and engines. The 15-passenger vans are higher off the ground, longer, taller, heavier, have less visibility, and are more powerful than typical passenger vehicles. Add the weight of 15 people and some gear and you've got quite a truck-driving job ahead of you. Whoever is driving needs to be skilled, trained and experienced.

Why can't we load them to maximum capacity? The center of gravity of an empty van is already higher than most passenger vehicles. The risk of having a roll-over crash is about the same as for a pick-up truck, while the van is empty. As you add passengers, you add weight above the axles. If you pack the rear of the van first, you add weight behind the rear axle, shifting the center of gravity not only upward, but to the rear. This results in less ground pressure at the front, where you count on the front tires to steer with. The NHTSA report cited earlier stated that by the time you have ten people on board, you've tripled the risk of rollover that you had with only a driver on board. Fill all fifteen seats and the risk is now five times greater. Add in the difficulty in steering because your front wheels are barely touching the ground (and may even be coming off the ground if driving over bumps), and the risk is unacceptable.

Why all the focus on tires? Tire failure has been cited in many of the fatal crashes associated with these vans. With a vehicle weighing over 9,000 pounds, tires need to be above average. Manufacturers specify that light-truck (LT) tires are to be used for these vehicles rather than passenger (P) tires. The LT tires have many different qualities but the ability to take the weight and turn corners with it are two important ones. Ken Testorff, in a report he wrote for the U.S. Navy states that "a random check of government-owned and leased 15-passenger vans in mid-2001 revealed some had improper replacement tires installed. When tires don't meet the manufacturer's minimum standards for size, pressure and load, you're asking for problems. Heat rapidly builds up in such cases, creating the potential for tire failure, which can cause a driver to lose control and wreck."

Tire pressure, even with the proper tires, must be checked with a gauge and adjusted to the tire and vehicle specifications. If you have the correct tires, this should be the same for both. Begin by checking the federal certification sticker usually found on the driver's door pillar. This lists the vehicle's gross weight load limits (per axle), required tire type and size, and cold inflation pressure for front and rear tires. Compare this to the tires that are actually on the van. If sub-standard tires are present, they should be replaced prior to further use. Note that the pressures usually differ from front to rear. The front is usually about 50 p.s.i. while the rear is usually about 80 p.s.i. Only a good tire pressure gauge will tell you if you need more air.

Why are 15-passenger van wrecks so often fatal? Eighty (80) percent of those who died in 15-passenger van crashes were not wearing their seat-belts. Even people who normally wear seat-belts don't feel the need, or don't remember to wear them when they get inside a van. The driver is the one person who usually remembers to fasten his or her seatbelt, and is the one person who can remind others to do so - or the van doesn't leave the parking lot!

Lastly, what are your recommendations? The following were arrived at after studying numerous university, military and other government agency procedures, NHTSA statistics and reports, and advice from the National Safety Council's Defensive Driving Course. They are written from the standpoint of preventing loss of life while still being able to accomplish objectives. Input has come from several universities within the IHL system. Universities can create their own procedures based on these recommendations. While stricter standards may be chosen, these recommendations should be considered minimum allowable considerations. Recommendations may be changed or added in the future as additional information is obtained.

Summary of Recommendations IHL Safety and Loss Control - June 2005

1. Drivers should be experienced.
How this is measured can vary:
 - a. Having held a driver's license for at least five years.
 - b. Being of a certain age (25 is common) assuming they have been driving since the earliest allowable age (15 in MS).
 - c. Having driven a truck or other large vehicle could be part of experience (10 years driving a motorcycle may not help much when driving a 9,000 + lb. van with 15 lives on board)
2. Drivers should be skilled.
Do they have a *good* driving record and, does it include vans or similar vehicles?
3. Drivers should be trained.

There are currently few if any standardized courses for driving 15-passenger vans. Course should include a minimum of 4 hours classroom and demonstrated successful performance behind the wheel on a closed course. Standard expiration for this or similar training is three years. Content should include reference to actual university owned vans, characteristics, manufacture's specifications, maintenance, accident statistics, risks, load placement, capacity, operation, defensive driving strategies, university policies, route/trip planning, emergency procedures, other topics as identified.

4. Driving time should be limited.
Fatigue is a common factor in crash statistics. Universities should adopt a policy to prevent driver fatigue while safely accomplishing the mission of the group traveling. Consider driving time as related to wakeful time within a 24 hour period. A standard work day being eight hours, this might be a good limit for the average driver. The Department of Transportation allows more hours behind the wheel for commercial truck drivers, but requires the next eight hours to be "off duty". Taking a ten-minute break every 100 miles or two hours is also a recommendation of the National Safety Council.
5. Time of day should be limited.
National Safety Council discourages driving between the hours of midnight and 6:00 a.m. due to condition of other drivers and likelihood of fatigue and/or meeting other drivers who are intoxicated.
6. Drivers should be held responsible for the safe and lawful operation of the vehicle they are driving.
Auto insurance and the MS Tort Claims Act will apply to liabilities while operating in the course and scope of one's duties. Deviations from duty and violation of state or federal law should be understood. For these reasons and others, allowing non-employees to drive university owned vehicles is discouraged. Authorization for non-employees to drive university owned/rented/leased vans should be documented.
7. Vans should carry no more than 10 people.
This includes the driver and up to nine passengers. This is based on NHTSA recommendation and operating at triple the risk of roll-over than if the van were empty. With eight people, the risk is 2.2X. Limiting the total number to eight is also a common practice. Removal of one or more rear seats will help facilitate this practice.
8. Vans should be loaded from front to rear.
Fill front seats first to avoid under-steerage problems. All things being equal, place heaviest part of load (passengers or equipment) toward the front.

9. Roof racks or other “car-top carriers” should be prohibited.
The risk of roll-over is magnified with the height of cargo.
10. Cargo should be low and secure.
Keeping the center of gravity low will help reduce the risk of roll-over. Tie-down straps, cargos cages or other restraints should be used to prevent cargo from shifting during transit or from causing additional injury in the event of a collision.
11. All occupants must wear safety-belts (lap and shoulder).
Driver should make sure everyone is properly secure prior to operation of vehicle. The number of properly working seat-belts should determine the maximum number of passengers.
12. Towing (if allowed) should not be done with passengers.
If it is absolutely necessary to tow a trailer with such a van, no more than one passenger (to assist driver) should be onboard the van. Other cargo within vehicle specifications can be allowed. Owner’s manual should be consulted for safe towing procedures and safe limits. Trailers must meet requirements as established in Title 63 of MS Code. Only drivers with experience towing trailers should be allowed to operate vans with trailers attached. Avoiding the use of trailers is strongly suggested.
13. Backing should be performed with extra caution.
If a passenger is present, he or she should exit the van and stand near the rear of the van to give guidance to the driver as it is backed. Drivers should walk around the rear of the van prior to backing alone to ensure an otherwise unseen object or person is not in harm’s way.
14. Emergency equipment should include proof of insurance, fire extinguisher, first aid kit, highway warning triangles and tire pressure gauge.
Larger items should be fastened securely to vehicle to prevent injury during a crash, protect equipment, and provide a reliable location when needed.
15. Drivers should conduct a pre-trip inspection prior to each trip.
A checklist should be used to document inspection and note any needed repairs. Standard items should include: actual tire pressure (requires tire pressure gauge), tread wear, all lights and signals, reflectors, windshield wipers, windshield washer, mirrors, brakes, fluid levels, belts, hoses, horn, emergency equipment, cargo security and others as identified.
16. Monthly inspections should be performed by a qualified mechanic.
This is a more detailed inspection that is also documented, with repairs being made as needed. Reference should be made to any driver inspections

made since previous monthly inspection.

17. Provisions for repair of safety-related items during travel should be identified.
Drivers will need authority and procedure for replacement of tires that are about to fail, or headlights or wiper blades that don't work, for example.

18. All recommendations apply to rental/lease vans as if they were university owned.
The university will be expected to cover liabilities and ensure the safety of passengers regardless of ownership. If vehicles cannot meet standards established for university owned vans, another source should be sought. Rental companies may have additional rules/procedures that should be followed, such as minimum age requirements for drivers. None of these recommendations is intended to exempt any rule or procedure from renting and leasing authorities.