



High Occupancy Vehicle Safety

Fact Sheet

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NRSPP Thought Leadership: High Occupancy Vehicle Safety

Background

High Occupancy Vehicles (HOVs) are defined as on-road vehicles, which carry nine to approximately 30 passengers and are below the heavy vehicle classification of 4.5 tonnes. HOVs present a significant safety problem for a number of reasons, including a higher likelihood of rollover crashes, tendency to be older vehicles with fewer safety technologies, common usage in remote areas, and a higher likelihood of severe injury in the event of a crash.¹ Within the HOV category, 15-passenger vans, Minibuses, and Tour Buses/Motorcoaches are the most common.



Figure 1: Shire of Gingin Community Bus

HOV Survey

Collectively, Local Governments manage a significant fleet of high occupancy vehicles (HOVs) that are widely used in different ways in the community. WALGA's RoadWise conducted a survey of Local Governments to gain a better understanding of the challenges and issues encountered in managing these vehicles.

The findings from this study, published on the WALGA website in January 2021, identified opportunities to provide support to Local Governments to manage the safe use of HOVs. This Fact Sheet is a next step in the process of developing resources to help Local Governments identify safety issues relating to HOVs and to address these issues.

Safety Research

While vehicle safety does play a role in crashes for HOVs, the majority of HOV road crashes involve human error.² However, the WALGA RoadWise High Occupancy Vehicle Survey Report indicates that 20 percent of the vehicles managed by Local Governments are 10 or more years old, increasing the possibility that these vehicles are outfitted with fewer safety features. This lack of safety features may play a role in a crash event.

Rollover Crashes

As HOVs have a higher centre of gravity and are heavier than light passenger vehicles, the likelihood of a rollover crash is substantially higher in HOVs. In fact, the research indicates that HOV passengers are three times more likely to die in a rollover crash than passengers in light passenger vehicles.

Of the different types of HOVs, 15-passenger vans, when loaded to above half of their seating capacity, have 2.2 times the rollover rate as compared to when loaded to or below half of their seating capacity.³

¹ National Road Safety Partnership Program (NRSPP), NRSPP Thought Leadership: High Occupancy Vehicle Safety. May 2019. <https://cdn-s3-nrspp-2020.s3.ap-southeast-1.amazonaws.com/wp-content/uploads/sites/4/2019/05/11181656/High-Occupancy-Vehicle-Safety-2019-v2.pdf>.

² NRSPP Ibid.

³Subramanian, R. (2004). Technical Report DOT HS 890 735: Analysis of Crashes Involving 15-Passenger Vans. USDOT: National Highway Traffic Safety Administration. Washington D.C. [Analysis of crashes involving 15-passenger vans \(semanticscholar.org\)](https://www.semanticscholar.org)

In comparison with fully-loaded automobiles, fully-loaded 15-passenger vans are 13 times more likely to rollover in the event of a crash.⁴

Research also indicates that seatbelt use played a significant role in the severity of injury in the event of a single vehicle rollover crash and that the use of passenger restraints greatly reduced the severity of injury.⁵

Speed

Travelling at excessive speeds is another major contributing factor to large vehicle crashes. One study found that HOVs travelling on roads with speed limits over 80 km/h had five times the likelihood of a rollover crash than HOVs travelling on roads with a posted speed limit under 80 km/h.

The likelihood of a rollover crash is also influenced by the location on the roadway. Rollover crashes increase by a factor of two when a 15-passenger van travels through a curve as opposed to on straight sections of road, while travelling on higher speed roads (80 km/h and higher) is correlated with a fivefold increase in the likelihood of a rollover crash.⁶ Whether a van or large truck, the likelihood of a rollover crash increases with excessive speeds, particularly in curves.

Improper Loading or Overloading

Another factor that influences the likelihood of rollover crashes in HOVs is improper loading or overloading. As a larger vehicle, the centre of gravity is higher, so it is important that passengers are seated evenly to avoid unbalancing the vehicle.⁷

Pedestrians

As heavier vehicles, the braking distance is longer for HOVs and HOVs are less able to handle abrupt manoeuvres than passenger cars.⁸ This relates directly to the high incidence of crashes involving HOVs and pedestrians. According to the National Road Safety Partnership Program (NRSPP) report on HOVs, the most common crash event resulting in a fatality involves HOVs and pedestrians.⁹

The Driver

In the case of passenger buses, the research indicates that driver behaviour influences passenger safety more than demographics. While gender is not correlated with severity of injury occurrence to passengers, the severity of crashes is influenced by young drivers (under 24 years of age).¹⁰ Fatigue is also an issue for HOV drivers, particularly on longer journeys.

Risky behaviour on the part of the HOV driver is also a factor in HOV crashes. At intersections, for example, the severity of bus crashes increases, when bus drivers traverse the intersection during the red or amber phase of traffic signals.¹¹ There was also a statistically significant association between drivers with a record of previous violations and crashes and the likelihood of those drivers being involved in a future crash.¹² As such, driver training and periodic re-training can play a crucial role in ensuring the safety of HOV passengers.



Figure 2: City of Cambridge Shuttle

Interventions

The research suggests that some interventions are helpful in reducing the likelihood of crashes for HOV vehicles. In particular, fleet level policies including training programs, incentive programs for crash-free driving and road safety awareness programs, can have a positive effect on the frequency of crashes.¹³

⁴ Potter T, Dubois S, Haras K, and Bédard M. (2013) "Fifteen-passenger vans and other transportation options: a comparison of driver, vehicle, and crash characteristics." *Traffic Injury Prevention*. Vol. 14(7): 706-11.

⁵ Prato, C.G. and Kaplan, S. (2014) "Bus accident severity and passenger injury: evidence from Denmark." *European Transport Research Review*. Vol. 6: 17-30. <https://etrr.springeropen.com/articles/10.1007/s12544-013-0107-z>.

⁶ Subramanian. 2004. Ibid.

⁷ NRSPP Ibid.

⁸ NHTSA. (2020). "15-Passenger Vans." <https://www.nhtsa.gov/road-safety/15-passenger-vans>

⁹ National Road Safety Partnership Program (NRSPP), *NRSPP Thought Leadership: High Occupancy Vehicle Safety*. May 2019. <https://cdn-s3-nrspp-2020.s3.ap-southeast-1.amazonaws.com/wp-content/uploads/sites/4/2019/05/11181656/High-Occupancy-Vehicle-Safety-2019-v2.pdf>.

¹⁰ Prato Ibid.

¹¹ Prato Ibid.

¹² Blower, D., Green, P., and Matteson, A. (2008). "Bus Operator Types and Driver Factors in Fatal Bus Crashes: Results from the Buses Involved in Fatal Accidents Survey." University of Michigan Transportation Research Institute. Ann Arbor, Michigan. [Motor Carrier Type and Factors Associated with Fatal Bus Crashes \(umich.edu\)](https://umich.edu/motor-carrier-type-and-factors-associated-with-fatal-bus-crashes)

¹³ Gray, I. (1990). "An attempt to reduce accidents in a company car fleet by driver training and encouragement of low risk driving habits." *Journal of Traffic Medicine*.

Additionally, building a strong safety culture within an organisation and implementing measures under this safety umbrella is likely to have an effect on safety.¹⁴

Ensuring the vehicles are fitted with current safety features will also play a role in increasing the safety of HOV passengers, while implementing fleet management plans will ensure that HOVs as well as other Local Government vehicles are held to a safety standard.¹⁵ These and other measures are summarised in the following section.

Measures

There are a number of measures that Local Governments can implement to reduce the likelihood of a crash involving an HOV and increase the safety performance of their HOV fleets. Broadly, these measures fall into three categories: the Driver, Vehicles, and Passengers.

The Driver

As indicated, the driver of a HOV plays a large role in mitigating the risk of a crash. The following actions on the part of the Local Government can help ensure that issues with the drivers of HOVs are minimised. Local Governments should ensure:

- Drivers have a valid licence to operate the HOV and have the necessary training to properly operate the HOV.
- Drivers are initially assessed and are periodically re-assessed with regard to the ability to drive the HOV.
- Driver's ability to drive the HOV should be re-assessed, in the event of a crash/incident.
- New drivers of HOVs are provided with safety information as part of their induction.
- The driver has the skills and knowledge of the specific vehicle to drive the vehicle safely.
- Drivers are medically able to drive a HOV.
- Drivers of HOVs understand their responsibilities with regard to fatigue mitigation (regular rest breaks, well-rested before they drive, etc.).
- Drivers certify passengers use restraints while the HOV is in operation, if applicable.¹⁶

Vehicles

It is the responsibility of the owner of the vehicle to ensure it is in good working order. Many older vehicles may not be fitted with safety features. Local Governments should consider

- the provision of after-market safety solutions (e.g. speed limiter, etc.) for older HOVs in Local Government fleets.
- how their HOVs are maintained and checked for road-worthiness prior to use.

Passengers

While it is the responsibility of HOV drivers to ensure that passengers are appropriately restrained during the operation of the HOV, passengers themselves should

- Understand the risks associated with HOVs and take steps to mitigate the risks.
- Receive a briefing regarding the safety features of the HOV and risks associated with HOVs

The provision of briefings to passengers should be incorporated into the policies regarding the use of the HOV.



Figure 3: Shire of Manjimup Community Bus

Next Steps

By building a strong safety culture and incorporating road safety awareness across the organisation, Local Governments can have a strong influence on safety in their communities. With regard to HOV fleets, providing a fleet safety policy and implementing training initiatives can help embed good safety practices into the day-to-day operation of a Local Government.

For further advice and assistance, please contact your nearest Road Safety Advisor. Information can be found under the website link below.

Contacts Us

Email roadwise@walga.asn.au

Website www.roadwise.asn.au/contact-roadwise.aspx

¹⁴ Downs, C.G., Keigan, M., Maycock, G. and Grayson, G.B. (1999). "TRL Report 390: The safety of fleet car drivers: A review." *Transportation Research Laboratory*.

¹⁵ Wegman, F. and Noltenius, M. (2008). *Fifteen Passenger Van Safety – Recommendations on Best Practices for Commuter and Community Transportation*.

<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.683.5313&rep=rep1&type=pdf>.

¹⁶ NRSPP Ibid.