



To:
The Chairperson
School Transport Safety Task Force
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SUBMISSION TO IMPROVE SAFETY FOR CHILDREN IN AND AROUND SCHOOL BUSES

Index:

Topic	Page
Introduction	2
Another Inquiry into School Bus Safety - 'It's Déjà vu All Over Again'	3
Accident Risks & Injury Risks	5
Identifying Categories of Risk	6
Crashworthiness of Buses	7
Impacts with Vehicles of Similar or Greater Mass	8
Rollover Accidents	9
History of Seatbelts in Australian Cars	11
History of Seatbelts in Australian Buses	13
Standing in The Aisles	18
Adequacy of Rural Emergency Services	24
Safety Around School Buses	25
School Bus Stops	26
Identification	27
Traffic Calming	30
Driver Education	31
Enforcement	32
APLA's Recommendations	32
Recommendation 1 – Risk Audit	32
Recommendation 2 – Standing in the Aisle	34
Recommendation 3 – Padding Interiors of Buses	34
Recommendation 4 – Three for Two Policy & Seatbelts	34
Recommendation 5 – Bus Identification & Traffic Calming	35
Recommendation 6 – Emergency Services	36
Recommendation 7 – Bus Collection & Set Down Zones	36

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SCHOOL BUS SAFETY IN AUSTRALIA

By Rob Davis.¹

Introduction

Every day thousands of children travel to and from school by bus. Some of these journeys are short, in relatively new vehicles travelling at safe speeds on well designed city roads and driven by safe and conscientious drivers. Many others are long, in poorly maintained, aging and overcrowded vehicles driven across bad roads.

None of these vehicles are fitted with seat belts or built to withstand serious impact, let alone a simple rollover. In most cases three primary school children are required to occupy two adult seating positions and in others children are regularly required to stand in the aisles. The seats are a simple bench construction with hard steel handrails across the seat backs. There are no armrests, headrests or seatbelts to keep children in place in an accident. In nearly all cases the seats are attached to plywood floors or use brittle cast alloy seat supports. In serious accidents and rollovers these seats detach from the bus structure and fly about the cabin impacting with passengers.

None of these buses are adequately identified as carrying school children. When these buses stop, young children leave the buses and often walk and run across the roads from in front of the bus. Passing motorists are unaware of the risks they pose to young children. For example, no State educates drivers to exercise the same levels of care when approaching a stationary school bus, as they are required to exercise when approaching any pedestrian crossing.

In Australia children are injured and killed every month from accidents in and around school buses. Further, the potential for large-scale death and injury from major bus accidents is ever present.

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There are many things that can be done to significantly reduce the risk of injury and death to children using school buses.

Some of these things are cheap, effective, and capable of almost immediate introduction. Others, will require expense and commitment to implement, even if phased in over a long period of time. In every case, action depends on the exercise of principled political leadership.

One thing is perfectly clear. Major school bus safety reform is necessary and will eventually occur. The only question is how many more children will have to be injured and die first.

There are about 20 times more people injured on roads each year than are killed.² The most emotionally and economically devastating of these injuries are those that involve serious personal injury to children. Children have their entire lives ahead of them and permanent disability to a child can destroy that child's capacity to achieve his or her true potential in life. Parents and siblings who have to care for a physically or intellectually crippled child have a lifetime of responsibility, heartache and pain imposed on them. Often the full cost of this loss is never born by society as a whole due to the massive amounts of uncompensated care and support provided by family members.

As adults, we have a responsibility to care for the children of this State. That responsibility is both moral and legal. The onus imposed by that responsibility is at it's highest whenever adults knowingly expose children to known but avoidable risk of death and injury.

The risks children face in school bus travel are well known and largely avoidable.

Another Inquiry into School Bus Safety - 'It's Déjà vu All Over Again':³

represented the owner of the bus in which 11 people were killed and 42 were seriously injured at Henri Robert Drive Mt. Tamborine Queensland in September 1990.

² For example, in 1994 twenty children died and 400 are estimated to have been injured while travelling to and from school. This is a ratio of 20:1 of injury to death in that year. Source: FORS Monograph 26 of 1999.

³ Apologies to USA President George W Bush.

The announcement of the current 'taskforce' to investigate and report on school bus safety will have left many with an acute sense of déjà vu. It has, of course, all happened before. So no one with experience in this issue has high expectations that safety reform will occur soon.

For example, in 1994 the then NSW Minister for Transport referred the issue of alighting children being struck and killed by passing traffic to the NSW Staysafe committee. The committee duly investigated the issue and released 'Staysafe 26', a report that called for far reaching changes to both school-bus identification and traffic calming around school buses.

The RTA and subsequent NSW governments largely ignored these recommendations. The end result is that little useful change has occurred, notwithstanding the expiration of 8 years since the recommendations were made. A similar situation has occurred in relation to overcrowding and standees on NSW School Buses.

Queensland has a similar history of inaction. For example, 1995 the then Queensland Transport Minister, Vaughan Johnson, announced that the practice of standing on school buses in 100 km zones would be 'phased out'.⁴ This announcement followed increasing public concern over the risks faced by standees in the event of an accident. The promised reform has not occurred notwithstanding that 5 years has since elapsed since it was announced. The then Shadow Transport Minister, Jim Elder, later accused Mr. Johnson and the Coalition Government of 'stalling' in its promise to eliminate standees.⁵

Earlier this year the Queensland Opposition promised, if elected, to allocate \$22 million towards, among other things, eliminating standees and introducing seatbelts. Opposition leader Bob Borbidge claimed that the issue of 'overcrowding on school buses had been ignored by both sides of politics for too long' and that it was now time to get on with fixing the problem.⁶

This call was strongly supported by the Shadow Transport Minister (and former coalition Transport Minister) Vaughan Johnson who announced the Coalition's intent (if elected) to

4 Press Release of National/Liberal Policy Statement July 1995.

5 Gold Coast Bulletin, 18 April 1996.

6 Gold Coast Bulletin, January 9, 2000.

accelerate introduction of new seat-belted buses and retrofit old buses capable of taking seatbelts.

Perhaps the most ironic statement to come from Mr. Johnson at that time, given his own government's failure to deliver on a similar promise made five years earlier when he was Transport Minister, was:

'And finally, we need to work towards the eradication of standees, beginning with hazardous routes such as mountainous terrain, poor roads, high speeds and high traffic volumes'.⁷

Liberal Leader Dr. David Watson, claimed at the time that '...cost has been used as an excuse, but what cost can you put on a child's life'.⁸

The Acting Transport Minister, Paul Braddey, accused the opposition of misleading the public by suggesting that \$22m would be adequate to eliminate overcrowding on school buses. Mr. Braddey alleged that the true cost involved would be closer to half a billion⁹ dollars over 10 years.¹⁰ In actual fact, Mr. Braddey's 'estimate' also appears misleading as the Premier's Office has since claimed the actual estimate falls '...between \$332 and \$556m over 12 years'.¹¹

Everyone, it would seem (while in opposition at least), now acknowledges that there is a serious problem. Sadly we appear lack the most important ingredient needed to fix the problem. That is political commitment to put children's lives ahead of what, even on Mr. Braddy's inflated cost estimate, a small price to pay.¹²

Accident & Injury Risks:

7 Qld Coalition press release on School Bus Safety dated 7th January 2001.

8 Qld Coalition press release on School Bus Safety dated 7th January 2001.

9 The precise estimate 'claimed' was \$550m over 10 years to both ban standees and fit seatbelts to all school buses. The 'actual' figures estimated by Transort are between \$332 and \$556m over 12 years. Mr. Braddy used the higher figure of the estimate.

10 Claims since repeated by Mr. Whiddon of the Premier's Office in a letter to the President of the Queensland Law Society on the 12th February 2001.

11 Mr. Whiddon of the Premier's Office in a letter to the President of the Queensland Law Society on the 12th February 2001, page 3.

Identifying Categories of Risk:

There are two categories of risk that cause injury and death.

First is the risk that any given bus will be involved in an accident of a given magnitude or type (called 'accident risk'). The two main types of accident risk are impacts¹³ and rollovers.¹⁴ Impacts can occur from any direction.

Sometimes impacts result in rollovers.¹⁵ Often however, rollovers occur because of simple mechanical failures.¹⁶ Sometimes the mechanical failure is serious enough to be the sole cause of an accident.¹⁷ Other times the mechanical failure is insignificant unless combined with unusual circumstances that chaotically combine to cause tragedy.¹⁸

Sometimes fate operates in our favor. For example, in November 1997 a school bus carrying 90 children suffered break failure on a steep decline in the Hinterland of the Sunshine Coast. A major tragedy was only avoided by luck when the bus driver was able to run his bus into the rear of another bus. Nonetheless, 90 children were still treated for injuries.¹⁹

On other occasions child passengers have not been so lucky. The tragic accident near Cairns in 1989, in which six children died, is an example of this type.

The second is the risk that passengers travelling in the bus will sustain injury or death in the bus accident. This second type of risk is heavily influenced by the

12 Half a billion dollars over 10 years is only \$50 million a year. In adjusted present values, this equates to about the same capital cost as the current government recently committed to build a new football stadium in Brisbane!

13 Such as occurred in the Kempsey and Grafton accidents.

14 Such as occurred in the Cairns, Tamborine and Gateway accidents.

15 Such as occurred at Gracemere Queensland on the 7th March 2001.

16 Such as Gateway (steering failure) and Tamborine (break failure).

17 Gateway.

18 For example, the Tamborine tragedy was caused by an unusually dangerous road design (steep decline on a corner) coupled with a decrease in braking efficiency due to oil leaking onto the break in one wheel.

19 Sunday Mail, November 30, 1997.

crashworthiness of the vehicle and the existence of active and/or passive restraints to mitigate the risk of injury or death.

Accidents, by definition, are unpredictable. They can occur in any vehicle at any time, regardless of the skill of the driver or the age and mechanical condition of the vehicle. Suffice it to say however that mechanical condition of the bus, road conditions, and other traffic all increase the risk of tragic accidents.

While accident risks can never be eliminated, it is always possible to ensure that the occupants of the vehicle are not exposed to unnecessary risk of death and injury when an accident takes place. This is why cars are fitted with airbags, three point seatbelts, seatbelt pre-tensioners, front impact crumple zones, side impact bars, seat headrests, and rollover bars.

In short, vehicle crashworthiness has become an integral part of passenger car and truck design over the last 30 years. Unfortunately, buses are a long way behind in this area.

Crashworthiness of Buses:

Buses are designed to maximize operational economy, seating, passenger visibility, and ease of loading and unloading. They are also designed to be price competitive. Design is always a trade off between construction cost and passenger safety. This is always the way with vehicle design. This is why passenger vehicle manufacturers had to be forced to improve vehicle crashworthiness before minimum safety features, such as seatbelts, were introduced.

In low impact crashes between buses and passenger cars, buses come off better. Two factors are responsible for this. First, the center of gravity of buses is much higher off the ground than it is for passenger cars. Second, buses have much greater mass than do passenger cars. So when a bus hits a car, or vice versa, the car's forward momentum is cancelled by the mass of the bus causing the car to decelerate faster on impact.

For example, in a head on collision, the car's forward momentum can be cancelled and its direction of travel reversed by the momentum of the bus. The bus strikes the car higher, riding over the car's own impact safety zones, causing extreme damage to the smaller vehicle and its occupants.

The higher center of gravity of buses, while an advantage in impacts with smaller vehicles, places buses at increased risk of rollovers in extreme maneuvers. There are also other circumstances in which buses do not fare well at all when compared to passenger cars.

Impacts with Vehicles of Similar or Greater Mass:

The absence of adequate impact protection and passive restraints leads to death and injury when buses collide at high speed with other vehicles of similar or greater mass.

For example, in the Kempsey crash 35 people died. Similarly, in the Grafton accident 20 people died. Everyone who survived these accidents suffered injury, some very seriously. In January 2001 a school bus collided with a Quarry truck in the Barossa Valley SA killing the driver injuring 40 children, some critically.

Figure 1. School Buses passing on a Narrow Country Road.



Circumstances in which two buses, or a bus and a large truck can impact head on are surprisingly common on country roads throughout the state.

Rollover Accidents:

Buses are not designed to withstand rollover accidents. They are designed with lots of glass windows to confer maximum visibility to passengers. When a bus rolls over and strikes a top corner the entire roof above the line of the lower window edge distorts. Sometimes the roof can collapse totally.

Figure 2. Deformation of Roof Structure on Rollover.



In the Tamborine crash cabin distortion resulted in windows popping out. When the windows go there is nothing holding occupants inside the cabin. As a result (as occurred to some at Tamborine) limbs and torsos protrude from the bus as it rolls, crushing occupants.

Figure 3. Tamborine Bus Accident Rescuers Extracting Bodies.



In addition to the above factors there are a number of other features of bus design that substantially increase the risk of injury and death in an accident. Most buses used to carry school children are quite old. The majority of these were designed to carrying passengers on low speed metropolitan routes. As such, they are fitted with simple bench seats with no padding on the rear of seat belts, low back rests, and steel bars along the back rests for handrails.

Figure 4. Typical Interior and Seating found in School Buses.



In even low speed impacts and sudden deceleration seated children are flung forward and strike their heads on the hard seat backs and steel rails. Each year this results in many children suffering facial and dental injury as the result of very minor bus incidents.

In 1997 the NSW Motor Traffic Regulations were amended to require all hard objects in buses (such as seat backs, hand-rails and partitions) to be padded.²⁰

The regulation applies to all buses accredited to operate regular passenger service and all new buses first registered after 1 August 1997. No similar measures have yet been introduced in Queensland.

The seats in buses are usually affixed to the floor by screws. Often the floors are composed of nothing more substantial than ply wood. The seats themselves are not designed to withstand any minimum impact requirements.

In many cases the seat supports are made of brittle cast alloy that shears in a serious impact. The loose seats then become hard dangerous objects that fly forward (in front impacts) or fly about the interior (in roll over incidents).

For example, in the Tamborine accident several of the seats snapped off from their floor attachments and flew about the interior of the bus as it rolled over, smashing into passengers and generally contributing to the horrific level of death and injury experienced in that tragic event.

This was one of the major risks addressed by ADR 68/00 (which will be referred to later in this submission). Unfortunately, and as will be seen later, ADR 68/00 still does not apply to school buses. So our children continue to face these risks each time they travel in a bus.

History of Seatbelts in Australian Passenger Cars

²⁰ Technical Specification 148 issued 16 July 1997. Also see Motor Traffic Amendment (Bus Safety) Regulation 1997 gazetted in NSW Government Gazette Number 86.

The reasons why we need seatbelts in school buses are the same as the reasons why, a quarter of a century ago, we needed seatbelts in passenger cars. More Australians have died on our roads than Australians killed at war.²¹

On the 1st January 1970 Australian Design Rules (ADR) were introduced that made it compulsory to fit seatbelts to all new passenger cars. By 1973 all Australian states had passed laws making it compulsory to wear seatbelts wherever they were fitted.²²

At the time there was loud and vocal opposition to the reforms by taxi drivers, vehicle manufacturers, and many drivers. Those opposed to mandatory seatbelts argued, among other things, that:

- Seatbelts would increase the cost of cars;
- Would not reduce the levels of injury and death in car accidents;
- Would increase the risk of being trapped in a burning vehicle; etc.

Some even claimed that it was contrary to their 'rights' to be required to 'belt-up'. Many taxi operators opposed the reforms claiming that:

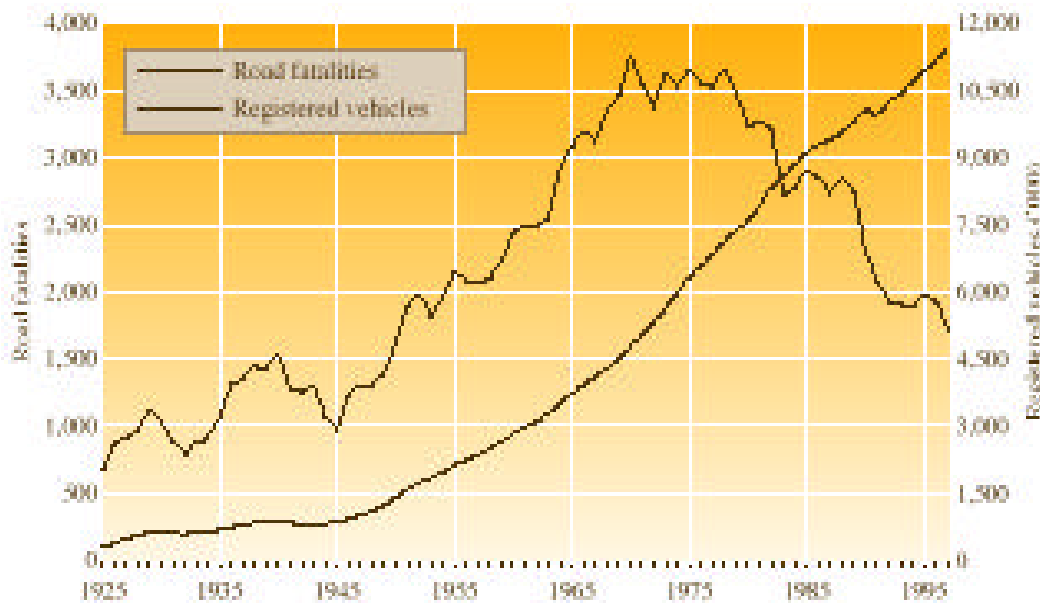
- Passengers would not wear the seatbelts; and
- Drunks and delinquents would vandalize the seatbelts by tying them in knots, etc.

The loud opposition from a small hysterical group of opponents to mandatory seatbelt reform dissipated soon the reforms were introduced.

²¹ FORS Monograph 23, 1998. Before 1998 over 160,000 citizens had been killed on our roads compared to 89,850 Australians killed in the four major wars fought this century.

²² FORS Monograph 23, 1998.

Figure 5. Level of Road Deaths Verses Number of Registered Vehicles.²³



In 1970 Australia experienced 30 road deaths per 100,000 head of population. Currently our road toll per 100,000 head of population is less than one quarter of the 1970 figure! During the same period there has been a huge increase in the number of registered passenger vehicles on the roads.

A number of factors are responsible for this dramatic decline in our road toll. Chief among them are greater crashworthiness of modern motor vehicles and mandatory wearing of seatbelts since the 1970 ADR was introduced. This fact is clearly evident from the Figure 5 above.

History of Seatbelts in Australian Buses:

Before 1992 no relevant rules existed for bus occupant protection in an accident. On the 30th October 1992 ADR68/00 was approved as a 'national standard' for occupant protection under section 7 of the *Motor Vehicles Standards Act 1989*.

Between 1970 and 1990 there were numerous fatal and near fatal crashes involving buses (including many buses carrying school children). We know this

²³ FORS Monograph 23, 1998.

because of media reports, not because of any statistics published by transport or other regulatory authorities. Many of these incidents have received only local media attention.

In 1989 we witnessed the start of the worst series of bus accidents we had ever experienced in Australia. This is how chance operates. Every run of good luck invariably ends. That is what happened between 1989 and 1990.

In March 1989 six children were tragically killed when their excursion bus rolled over on the Gillies Highway near Cairns, Qld. Soon after, in June 1989 fifty-four passengers were injured at Cobb Highway NSW when their bus left the road. In October twenty passengers were killed in a bus collision at Grafton. In December 1989 a further thirty-five passengers were killed in a collision at Kempsey. In May and July 1990 four more died in bus accidents at Berowra and Mt. Isa respectively. Then in September 1990 eleven passengers died at Mt. Tamborine.

At the Tamborine Inquest police accident investigator²⁴ gave evidence that summed up the anger and frustration experienced by all involved in investigating these tragic bus accidents:

'Each day I see heavily laden buses carrying both commuters as well as school children travelling our roads. Knowing what can occur to unrestrained occupants, seated as well as standing, it frightens me and yet at the same time angers me. It angers me because I know that this situation need not exist.

I have heard comments to the effect that to be injured in a bus is so many times less than a car or a motorcycle. I have heard comments that there has yet to be sufficient justification for the fitment of seat belts. I have heard comments that it would be too expensive to fit seat belts. I have heard numerous other comments as to why seat belts should not be fitted or only a limited number of seat belts provided.

In answer to these comments I can only say that had these persons seen what I, and those who took part in the rescue operation, had seen that day, there would be little doubt left as to the need for seat belts for all those who travel on buses. This does not refer to those buses of the future but to all buses now operating on our roads.'

24 Then Constable John Ruler.

The shocking impact of the Cairns, Kempsey, Grafton, and Tamborine accidents resulted in calls for bus safety reform. These calls resulted in adoption of ADR 68/00 in 1992. This design rule imposed, for the first time, objective standards for occupant protection and crashworthiness in buses. The rule makes specific provision for the following:

- Seatbelts;
- Seatbelt anchorages;
- Seat anchorages;
- Seat design;
- Seat strength.

The design rule applies to all non-exempt heavy buses manufactured after 1st July 1994, and all non-exempt light buses (over 3.5 tonnes) manufactured after 1st July 1995. The following categories of bus were (and still are) exempted from complying with the design rule:

- 'Route Service' buses;
- Buses with less than 17 seats; and
- Buses with seat heights of less than 1 meter.

The net effect of ADR 68/00 is that the only buses required to conform to the rule are interstate and long haul tourist and passenger buses. No school bus is required to comply with this design rule!

The reasons for this anomaly have nothing to do with school buses being inherently safer than any other bus. On the contrary, for the overwhelming majority of school bus routes around Queensland (with the exception of low speed city routes) the reverse is the case.

The real reason for the anomaly is economic. State governments do not want to provide school children with buses fitted with seatbelts. If school buses were required to have seatbelts then each child would have to be given a seat! At present, three primary school children are required to share two adult seating

positions and many others are required to stand in the aisles!²⁵ This 'overcrowding' is encouraged by government as a means of reducing the cost of providing subsidized school bus travel.

ADR 68/00 does not prevent accidents occurring. What it does do is dramatically improve the chances of survival, and reduce the risk of injury, to occupants when an accident occurs. Accidents are not confined to interstate and long haul buses. There is nothing about that category of bus that makes them more likely to have an accident than any ordinary school bus on a highway.

The evidence that seatbelts save lives in accidents is irrefutable. This has been proven beyond any shadow of a doubt in relation to passenger cars. It has also been proven many times since 1992 in accidents that have involved buses fitted with seatbelts when compared to those without seatbelts.

For example, in October 1994 a bus experienced steering failure on the Gateway bypass near Brisbane. The bus left the road and rolled over killing 12 passengers and injuring 40 others. In many respects this accident was unremarkable, yet the absence of seatbelts turned it into a mass tragedy. In January 1997 a tour bus left the highway near Tenterfield and came to rest in a ditch. This bus was fitted with seatbelts so, as tragic as this incident was, it could have been worse. Two passengers died in the incident. Neither of those that were killed was wearing seatbelts at the time of the accident.

Unfortunately Transport Ministers still oppose seatbelts in school buses. Sometimes their advisors go to incredible extremes to justify that opposition. For example, in the Melaney accident a spokesperson for the then Minister's office informed the Sunday Mail that seatbelts (if they were fitted) '...could have trapped children' in the accident!²⁶

It is often claimed that 'school buses' have an excellent safety record compared to other forms of transport. These claims are manipulated by convenient interpretations as to what does and does not constitute a 'school bus'. When

²⁵ See section 24 of the Qld *Transport Operations (Passenger Transport) Standard 2000*.

transport officials and bus operators refer to school buses they adopt the definition contained in Schedule 4 of the *Transport Operations (Road Use Management – Vehicle Standards and Safety) Regulation 1999*. The only buses that fit that definition are the relatively small number of buses in the state that are used ‘exclusively’ for carrying school children. The overwhelming majority of children in the state are, in fact, carried to and from schools by buses that are also used to carry paying adult passengers.

For example, it is often asserted that the Gillies Highway tragedy (in which 6 school children died) was not a ‘school bus’, but an ordinary bus carrying children on a ‘school excursion’. Similarly, the bus that recently overturned at Rockhampton²⁷ was carrying some adults (in addition to the majority of school kids), so it was not ‘technically’ a school bus. The reality is that any bus carrying school children is, insofar as the ordinary expectations of the public are concerned, performing service as a ‘school bus’.

Busses carrying school children are involved in accidents every day of the week.²⁸ In some cases the consequences involve death to children, as was the case in the Cairns crash. In others, through good fortune, serious tragedy is averted.²⁹ In these cases however, injury, often serious injury, is commonplace.

For example, on the 7th March this year (2001) a ‘Young’s Bus Service’ school bus rolled onto its roof at Gracemere near Rockhampton after being struck from behind by another vehicle. Two passengers were critically injured, nine seriously injured, and another 20 suffered more minor injuries. Fortunately this 54-seat bus was not carrying standees when the accident occurred.

Each day thousands of Queensland school children are transported by old buses along highways and narrow country roads at highway speeds. In many of these buses three primary school children are crammed into two adult seating positions with others standing in the aisles. None of these buses are fitted with seatbelts.

²⁶ The Sunday Mail, November 30, 1997.

²⁷ On the 7th March 2001.

²⁸ For example, there were four serious school bus accidents in Australia in the first month after school returned this year.

School children generally sit on bench type seats with steel rail backs, no rear seat padding, and no armrests to compartmentalize them in the event of an accident. That is, the children who are lucky enough to have a seat. Those who have to stand are worse off in the event of an accident.

Currently 30 USA States either have adopted, or propose to adopt seatbelts in school buses. Seatbelts are presently required in two states³⁰ and legislation has been passed, but is not yet in effect, in three other states.³¹ All USA school buses (whether currently belted or not) have, since the federal *School Bus Safety Standards Act 1976*, been required to have high backed ultra cushioned seats and seat backs. Contrast this position to that which exists in Australia.³²

The USA has an enviable reputation for child safety on school buses.³³ In part this is because of their commitment to ensuring children are contained in an impact, and the fact that all hard objects in their buses are carefully padded.

Suffice it to say, no state or territory in the USA permits children to stand in a moving school bus. Indeed, when American bus safety experts are advised of the environment and overcrowding in Australian school buses they are left in an incredulous state. To them, the way we carry children in school buses is considered to be barbaric. Their shock is compounded by the fact that they commonly view Australia, which was one of the first countries in the world to make seatbelts compulsory in passenger cars, as being a progressive country!

Standing in the Aisles – The Economics of Standees.

In 1973 Professor Joubert, in a report to the Federal Department of Transport entitled 'Review of Tuck & Bus Design In Relation to Road Safety' stated:³⁴

29 For example, the accident on the Sunshine Coast (Meleny) in November 1997.

30 New Jersey and New York.

31 Florida, Louisiana and California.

32 See, for example, Figure 4 above.

33 The USA has 450,000 dedicated school buses that carry 23.5 million school children to and from school each day. This is nearly the entire population of Australia, daily! These buses travel approximately 4.3 billion miles each year. Notwithstanding this massive task, the school bus occupant fatality rate for the entire USA averages only about 11 children per year. (Source: Scott Bowles, USA Today, February 19, 2001).

'The practice of transporting bus passengers standing in the aisle is dangerous and should not be permitted, especially for school children. Individuals standing in the aisle are far more likely to be injured than passengers that are seated regardless of the lack of quality of the seats. During a collision, they are thrown about the bus passenger compartment striking and injuring other individuals who may be adequately restrained.

The exposure for the standee relative to the head-on and rear-end collision is, understandably severe owing to no structure immediately in his path to retard his body being hurled down the aisle to strike the front or rear of the bus, forcibly and often head first.

It was found that conditions are or may be as serious for the side-impact owing to the abruptness with which the standee is thrown against other passengers and the side of the bus, or, in the instance of the individual standing near the front of the bus, he was thrown against the opening and ejected headfirst.

The standees chances of injury during collision greatly exceed those of seated passengers even when safety seats are not included in the bus.'

In short, standing is dangerous. Children that are seated are far safer in an accident, even without seatbelts and with pretty ordinary seat design, than they are standing.

In August last year Professor Joubert was asked to comment on the likely outcome of a hypothetical front end collision between an overcrowded school bus and a truck on a country road.³⁵ Professor Joubert opined as follows:

'The bus you describe loaded with 103 children and 40 standees together with school bags, no seatbelts, low backed seats with no energy absorption in an impact with another vehicle of equal or greater mass would, in my opinion, give rise to an accident greater than the Grafton disaster.

In a roll over that might occur there is potential for an equally disastrous event.

I would forecast a 40-50% death rate and over 90% injury rate for the remaining children.³⁶

Figure 6. Children Standing in Aisles of a Moving School Bus.



Statistics on the magnitude of overcrowding are hard to come by. There are two facets to the overcrowding issue. One is the children who have to stand in the aisles because they cannot get a seat. Another is the policy that permits three primary school children to occupy two adult seating positions.

The former face extreme risk in any accident. The latter also face high risk of death and injury in accidents (due to inadequate crashworthiness, lack of seatbelts and dangerous internal environment of the average school bus), although their risk is somewhat lower.

In 1993 the NSW Public Accounts Committee Report on the School Transport Assistance Scheme estimated that the elimination of the 'three for two policy' in

³⁵ The proposition was put to him by Kim Bax, a concerned parent from Woodhill who regularly sees this sort of overcrowding in her region. Ms. Bax became so concerned about the risks that she assisted in formation of the Bus Action Committee to lobby for changes in school bus safety.

³⁶ Letter from Professor Joubert O.A.M., Emeritus Professor in Mechanical Engineering of Melbourne University to Kim Bax dated 3rd August 2000.

that state would increase the rural transport budget by between 14-28%. That same report estimated that elimination of 'standing' passengers in NSW would increase the budget by \$59-80 million.

Earlier this year acting Queensland's Transport Minister (Paul Braddey) estimated it would cost 'half a billion' dollars over 10 years to eliminate overcrowding and fit seatbelts to all school buses.

The Premier's Office separately estimates the cost of providing seatbelts to all buses carrying school children to and from school in Queensland as falling between \$332m and \$556m over 12 years.³⁷ This latter estimate includes the cost of installation of belts into existing fleets and the purchase of new buses to meet extra demand by banning standees.³⁸ The cost is apparently made up as follows:

- (a) \$70-\$160m in the first year.³⁹
- (b) \$21-\$33m in each year thereafter.⁴⁰

If correct, this would seem a small price to pay given that this sum, reduced to present values, would be substantially less. Indeed, even if Mr. Braddy's estimate were averaged at full value, it still only amounts to \$50m per year! On the lower estimate the average cost is only \$32m per year. That seems a modest price to pay for the lives of a busload of kids!

A 1995 survey examined school bus safety issues in 1160 Queensland and 300 Northern NSW schools.⁴¹ Nearly one quarter of the schools surveyed⁴² provided detailed responses concerning issues such as injuries to children on buses, standing in aisles, etc. The responses to this survey revealed:

37 Letter from Premier's Office to President of the Qld Law Society 12th May 2001, page 3.

38 *Ibid.*

39 *Ibid.*

40 *Ibid.*

41 This survey was conducted by the law firm Attwood Marshall with assistance from the Qld Council for Parents & Citizen's Associations.

42 22.32%

- 38.15% of the schools that responded to the survey reported that children were required to stand in the aisles of school buses.
- On the conservative assumption that every school with an overcrowding problem had responded to the survey, then a minimum of 5.86% of Queensland State Schools and 10% of Northern NSW schools had a 'standee problem' on school buses. The true position is likely to be much worse than this minimum estimate suggests.
- The above statistics likely understated the magnitude of overcrowding generally on school buses as 83% of all responses were from Primary Schools and Government policy permits three primary children to occupy two adult seating positions.

Table 1. Concerns of Parents about School Bus Safety.

No	Area of concern about school bus safety	%
1	Overcrowding (children standing and sitting three per seat)	20.9
2	Safety of pick-up and set-down zones and school bus stops	20.3
3	Other traffic (at bus stops and pick-up and set-down zones)	10.5
4	Lack of seat belts	9.7
5	Poor condition of streets and (particularly) country roads	9.1
6	Lack of adequate road signs warning about school children	6.3
7	Lack of discipline of children on school buses	6.1
8	Mechanical condition and age of school buses	4.3
9	Inadequate supervision at bus stops and collection zones	3.7
10	Unsuitable bus drivers (old age/poor health/lack of student control)	3.3
11	Excessive speed traveled by school buses	1.8
12	Bullying of primary students by high school students on same bus	1.5
13	Drivers taking off before all children seated	1.5
14	Poor visual Identification of School Buses	0.9
15	Excessive distances traveled by school children on school buses	0.5
16	Children having to cross busy roads at bus change-overs	0.5
17	Unreliable timetables (leaving children at bus stops unsupervised)	0.4
18	Lack of emergency radio/telephone contact between bus and base	0.2
19	Drivers permitting children off buses at non-scheduled stops	0.2
TOTALS		100%

The concerns of all respondent schools were ranked according to frequency. Table 1 above sets out the results.

As mentioned previously, in 1995 and after the survey results were published in the media, the then Queensland Transport Minister Vaughan Johnson announced that the practice of standing on school buses in 100km zones would be 'phased out'.⁴³

⁴³ Press Release of National/Liberal Policy Statement July 1995.

This has not occurred notwithstanding that 5 years has now elapsed since then, and 28 years has elapsed since Joubert's⁴⁴ recommendations.

The current government has taken little concrete action to eliminate the risks children face from standing in the aisles of moving school buses. This is notwithstanding Labor's 1995 Opposition Transport Spokesperson having chided Vaughan Johnson for renegeing on his promise to eliminate standing on school buses at highway speeds.

For example, recently Queensland Transport 'proposed' the following changes to the 'Stande Policy' be 'trialed' in the Beaudesert area:⁴⁵

- Restricting speed limits to 80 km/h on roads with 100 km/h speed limits;
- Prohibiting standees at 100 km/h on single lane roads;
- Amending the method of calculating the number of children permitted to stand from the vehicle mass formula to 5 children/square meter;
- Reducing the distance that standees can be carried from 20 km (current) to 16 km.

While this constitutes a clear acknowledgement by Queensland Transport of the dangers standees face in an accident, the 'proposals' to 'trial' insignificant changes such as this are worthless. The evidence from eminent experts in the field is overwhelming on this point. Standing in the aisles is unsafe at any speed.

All cost estimates to fix the overcrowding problem contain a large uncertainty margin, but that fact alone underscores the lack of data on the magnitude of the overcrowding problem in Australia.

In short, the attitude of transport officials and government is to express horror at the cost and then turn a blind eye to the problem and hope it doesn't blow up on their watch. The cost is not going to get any cheaper. The problem is not going to go away and as each day goes by our children's luck is running out!

44 Professor P.N. Joubert O.A.M. Emeritus Professor of Mechanical Engineering, University of Melbourne.

45 Letter from Rob Whiddon (Chief of Staff at Premier's Office Brisbane) to President of Qld Law Society, 12th February 2001.

The best option, before it is too late, is to make a start towards fixing the problem. That means first identifying all routes where overcrowding occurs and providing operators that service those routes with reasonable subsidies to enable them to either add buses to their fleet, or alternatively, replace existing buses with buses of larger capacity.

Nobody with any credentials in transport safety seriously suggests that it is safe for children to stand in the aisles, or that the current crashworthiness design standards (or lack thereof) of school buses are adequate.

Adequacy of Rural Emergency Services:

Bus accidents pose special problems for emergency services. When an accident occurs it is crucial to provide rapid accident scene assistance to stabilize patients before transport to hospital. Delay in response results in greater fatalities. Unfortunately, once we leave the southeast corner of Queensland there are few facilities to enable any adequate response to a serious bus accident.

Indeed, even in the Tamborine and Gateway accidents, both of which occurred within 30kms of some of the State's major hospitals, emergency services were stretched to breaking point. Equipment was needed to cut out sections of the buses to access seriously injured passengers. Other equipment was needed to lift the vehicles off bodies. Ambulances and helicopters were required to carry injured and the dead. First aid and medical services were desperately needed at the accident site.

Rural buses face the greatest risk of accident. This is because of the poor quality of many country roads (many of which are narrow, winding, and with a gravel surface). Road trains carrying stock, heavy equipment, and grazing animals use these same roads.

In August last year a busload of school children overturned after it collided with a bullock on the Kennedy Development Road 270 km west of Winton in western Queensland. Two children ran 10km in an attempt to raise the alarm after this incident. While six children were injured in this incident (fortunately none were seriously hurt) they had to wait hours before they received medical treatment. If this accident had been more serious then the consequences of the delay could have been as serious as the accident itself.

A real case can be made for substantially increasing the capacity of emergency services to rapidly respond to mass tragedies in remote areas. But the most cost-effective solution is to reduce the risk of death and injury in these tragedies by improving the crashworthiness of buses that carry the kids.

Safety around School Buses & Bus Stops

Each year a large number of Australian children are catastrophically injured and killed through being struck by cars as they walk from in front of buses they have just alighted from. In 1999 the Federal Office of Road Safety examined road deaths to children during school travel.⁴⁶ This study found that 40% of fatalities were caused by children being run down and killed after alighting from school buses and 5% more were killed after alighting from public buses and a further 5% were killed after alighting from private cars.⁴⁷ The medium age of these children was only nine years of age.

The common law, for many years, has imposed a very high onus on car drivers to exercise extreme care when faced with a risk to child pedestrians. But, for some unfathomable reason, this onus has not been the subject of special attention under the traffic legislation. There is little wonder, in the light of this anomaly, that drivers are unaware of the risk they pose to children when they drive past stationary school buses.

The past emphasis has been for bus operators, schools and Queensland Transport to focus on educating school children of the dangers of walking in front of stationary school buses. While road safety education of children is important, it is not the only or even the most effective solution. Teachers and parents are all aware that children, particularly primary school children, do not perceive road risks in the same way that adults perceive them. This is due to a number of psychological, developmental and cognitive factors.⁴⁸

⁴⁶ FORS Monograph 26 of 1999. Compare the Australian and the USA position in this regard. The USA has laws that properly identify school buses and calm traffic around school buses. The USA has on average about 1/10 the annual school bus related child 'run down' fatalities of Australia. See the NHTSA statistics summarized in DOT HS 809 095.

⁴⁷ Contrast this with 5% killed in car accidents, 25% from cycle accidents and 20% killed while walking to school.

⁴⁸ For example, children do not have any real sense of their own mortality, they have very short attention spans, they easily become distracted, and they often have reduced peripheral vision. These differences are well documented and negatively impact upon the effectiveness of road safety education.

Focussing on education, without any proper attempts to calm traffic around stationary school buses and poorly located bus stops, is doomed to failure. Why do we expect children to exercise far greater responsibility for their own safety on the roads than we expect from adults driving the cars along those roads? Unfortunately, the 'back to front' logic that assumes 9 year old school kids should be more responsible than adult drivers is well entrenched among transport officials and politicians. This is an attitude that needs to change.

Examples of this type of official myopia are easy to find. For example, on the 12th May 2001 the Premier's Office sought to explain why it was not practical to reduce passing speed around school buses to 20km/h. One of the reasons advanced was as follows:

'At many school bus stops in rural areas, crests and curves in the road restrict visibility of the stops. In these situations, drivers might not be able to see a school bus in time to reduce speed to 20km/h.'⁴⁹

If the driver cannot see the bus in time to reduce speed to 20km/h, then what hope does a school young child have of crossing the road from such a bus stop? What is a school bus stop doing in such a location to begin with? Why not mark the speed zones on the road surface or with road signs so the traffic calming is around this type of school bus stop?

There are several solutions for traffic reform around school stops and school buses:

- Improving safety of school bus stops;
- Making school buses more visible;
- Calming traffic around school buses and/or bus stops;
- Educating the public about the changes referred to above.

School Bus Stops

Young children need safe access to and from set down zones. All children who use school buses need to cross at least one roadway each day in walking to and from their bus stop.

⁴⁹ Premier's Office to President of the Qld Law Society, 12th May 2001, page 5.

Safe crossing zones are, unfortunately, absent in many rural areas. Sadly, many rural bus stops are located around blind corners, over crests, and in other blind spots.

If drivers using the road cannot see the children in time to stop then it follows that the child must play Russian roulette every time he or she has to cross that road to use a school bus.

No bus stop used by school children should be located on crests and curves in the road where visibility is so restricted that other drivers cannot slow and stop to avoid school children on a road.

All drivers should receive ample advance warning of the location of school bus stops. In this context, ample depends on the nature of the road and the speed limit in place. 'Ample' is not defined by what is or is not 'convenient' to the driver, but by what is necessary to ensure the safety of children at the stop and those walking to and from the stop.

Identification

Division 18 of Schedule 1 of the *Transport Operations (Road Use Management – Vehicle Standards and Safety) Regulation 1999* currently sets out the requirements for identifying school buses.

These requirements provide for flashing amber lights and school bus signs and pictograms (on buses that commenced operation after 1999) and grand fathered the existing lights and school bus sign for buses that were operational at that time.

Division 18 is unsatisfactory in that it is specifically designed to exempt the overwhelming majority of buses that carry school children each day in Queensland. This situation needs to be changed in the manner set out below.

- First, the current definition of 'school bus' only applies to buses that are, at the material time, being used '...exclusively for the carriage of school

children to or from school.⁵⁰ This permits most operators to ignore the provisions with impunity.

Figure 7. Unmarked School Bus Depositing Children at a Bus Stop.



An example will illustrate the difficulty that this definition creates. Some time ago a number of parents were concerned that the school buses taking their children to and from school were not properly identified and did not use the flashing lights. These parents were concerned that this practice placed their children at risk as passing traffic would have no way of knowing that children might be alighting from these buses at set-downs.⁵¹

The parents made a complaint to the local police who then contacted the bus operator. A representative of the bus operator informed the police that it was not required to comply with the regulations as the bus in question was not 'being used exclusively' for the carriage of school children. In other words, the same bus sometimes carried paying adults!

50 This definition is contained in the dictionary in Schedule 4 of the Act.

51 This was only one of a number of similar instances that I am aware of in which bus operators are not clearly identifying buses that are carrying school children. One instance occurred late in 1997 when I was preparing a paper for the 2nd International Conference on Accident Reconstruction, Insurance and The Law. I attended the Palm Beach Currumbin High School at morning set down time and observed that only 1 in 4 buses carried the correct school bus sign, and none of the buses used their flashing amber lights.

The 'school bus' definition is, it turns out, not due to sloppy legislative drafting. It is, in fact, a concession to large metropolitan passenger services so they do not have to fit signs and lights to buses used for ordinary passenger routes. This concession places children's lives at risk and must stop.

The solution to this legislative slight-of-hand is to amend the definition of 'school bus' in the regulations to read:

"School bus" means any omnibus being used to carry school children irrespective of whether it is being used exclusively for that purpose".

- Second, the current provisions of Division 18 of Schedule 1 of *Transport Operations (Road Use Management – Vehicle Standards and Safety) Regulation 1999* (which set out the means by which school buses are required to be identified) are inadequate.

This was demonstrated in a 1995 telephone survey on the Gold Coast into the level of public awareness about how school buses are required, by law, to be identified. Of those respondents who had children attending school, only 9.5% were able to correctly state how school buses were required to be identified by law.

None of the respondents who did not have school age children were able to recall how school buses were to be identified (if at all). A total of 23% either did not know how school buses were required to be identified, or thought that they were not required to be identified at all!⁵² This demonstrates an appalling lack of knowledge among drivers about school bus identification.

This confusion is accentuated by the lack of uniformity in the application of the existing identification regulations,⁵³ two sets of identification standards, and by operators who clutter the backs and fronts of school buses with advertising signs camouflaging any 'school bus' signs that may be carried.

⁵² R. Davis, *School Bus Safety in Australia*, ARIL Conference Papers, 1997. A copy of the results of this survey is also available on the Internet in the 'School Bus Safety Resources' page at <<http://www.attmar.com.au>>.

⁵³ See section (1) of this paper.

The existing school bus identification requirements should be changed as follows:

- The grandfather exemption currently contained in regulations 99(2) and 103 should be removed. All buses that carry school children should display uniform identification standards based on those set out in regulations 100 to 102.
- The 'school Bus signs currently required at the front and the rear of school buses are too small. Regulation 102(1)(a) should be amended by increasing the height of the "school bus" sign from 100mm to 200mm.
- School bus signs are obscured by advertising clutter on the backs of buses. An additional regulation should be inserted to prohibit all forms of advertising or other visual clutter from the rear and front of any vehicle used as a 'school bus'. Alternatively, if advertising is to remain, the 'school bus' sign and 'pictogram' required by the current regulations should be a LED sign of appropriate luminous intensity to make it clearly obvious amid any advertising clutter.' This LED display should be lit at all times the bus is carrying school children.

Traffic Calming

Throughout North America and Canada road users are required by law to stop whenever a school bus stops and not move off until the school bus moves off. Examples of these traffic requirements are readily available on the Internet.⁵⁴ One example is §20-9.1-5-20 of the *Indiana Code*. The object of these laws, which work effectively for the over 300 million residents of Canada and USA, are to reduce the risk to children from being run down and killed by traffic passing stationary school buses.

We are not currently advocating amendments that would require road users to stop whenever a school bus stops (although such amendments would be strongly

⁵⁴ Many of these traffic codes are freely available on the Internet.

desirable). Instead we propose that the regulations be amended to require drivers to 'give way' to children within a 25 meter radius of a stationary school bus.

The quite satisfactory definition of 'give way' already states:

"...the driver shall, in circumstances where if the driver proceed there would be a reasonable possibility of the driver colliding with that ...person or otherwise creating a dangerous situation, slow down to such an extent, or stop and remain stationary for such time as is necessary to allow that ...person to continue on ...his or her course without risk of collision or as is necessary to avoid creating a dangerous situation".

This definition is essentially that which is required by the common law of negligence. Amending the regulation as suggested above would bring the provisions of the *Traffic Regulations* into line with what is already required by the common law. This will go a long way towards reinforcing to road users the importance of exercising extreme care when approaching a stationary school bus, (in much the same way as drivers currently lookout for pedestrians whenever they approach a pedestrian crossing).

Driver Education

The entire goal of the reforms referred to under the 'Identification' and 'Traffic Calming' headings are to modify the behavior of ordinary road users around stationary school buses. The goal of identification is to make those buses more visible so road users do not have to think twice about the identity of a school bus. This can only be achieved if the traffic laws impose real consequences for failing to exercise reasonable care when passing a stationary school bus.

While both (identification and traffic calming are crucially important to improving safety around school buses, it is equally important that the public be made aware of these requirements. This can be done by:

- Placing these amendments in the rules handed to applicants seeking driver's licenses;
- TV and radio advertising at the time of the changes and at the commencement of each school term.

Enforcement

At present the current regulations are utterly deficient. Indeed, they have been designed to exempt operators who provide the same buses to the paying public and subsidized school bus routes at different times of the day.

Laws must be enforceable if they are to have any purpose. These laws must be amended so all operators are required to comply with them, both in letter and in spirit. Until that occurs, politicians and transport must bear the moral approbation of the community for design of laws that are intend to give the appearance of substance, without any actual substance in fact.

Children die because these laws are inadequate and unenforceable. It is no wonder the community expresses such cynicism of politicians, political parties, and even the legal system itself, when laws like these are allowed to give a 'nod and a wink' to purpose, but are utterly meaningless in positive outcomes.

APLA's Recommendations

Recommendation 1 - Risk Audit:

That a full independent safety survey be commissioned in relation to each bus and each bus route carrying children to and from school.⁵⁵ Parents be enlisted from each school to assist this survey being performed.

The survey should, initially at least be performed in a census style, with each bus route audited at the point of set down at each school. The audit should take place on the same day for each area.

On that day each operator should complete an 'operator/driver' questionnaire and deliver it to the person collecting the data at the point of disembarkation. The questionnaire should identify information about the following types of issue in relation to the routes traveled that day:

⁵⁵ See, for example, the USA Final Report on Identification and Evaluation of School Bus Route and Hazard Marking Systems, June 1998. A copy of this report can be obtained from www.schoolbusfleet.com.

- Operator:
 - Name and contact details of Operator
 - Number of buses used carrying school children that day.
 - School or Schools serviced by that Operator.
- Standing & Loading:
 - Whether children were standing on the route just completed
 - Number of children carried on each Route traveled that day
- Bus Characteristics:
 - Registration Number of bus
 - Type of bus (manufacturer)
 - Age of bus
 - Mechanical condition of bus
 - Adult Seating Capacity
- Internal Bus Environment:
 - Seat types (eg: bench seats, individual seats, armrests, seat back heights, padding on seatbacks etc)
 - Location of handrails and other hard structures inside the bus
 - Floor type
 - Manner seats affixed to floor, etc.
- External Safety Identification
 - Existence of lights, signs and pictograms identifying bus as school bus.
 - Existence of advertising signage on the rear of the bus
- Bus Route Information in relation to each bus route for that day:
 - Identity of route.
 - Distance covered by each route.
 - Highest speed limit and lowest speed limit experienced on each route.
 - Type and condition of the road on each route
 - Identify special features of each route that increase accident risks to the bus (eg: stock, narrow roads, unsealed roads, blind corners, heavy vehicles, steep descents, etc).
 - Safety and suitability of pick-up and set down zones along each route.

This information then be collated, analyzed and used to classify bus routes according to accident and crashworthiness criteria. This analysis then be used to

prioritize areas for immediate remedial action and to develop and cost a strategic plan to progressively eliminate the main residual risks within a realistic time frame.

The survey be conducted and results made public during the current school year.

Recommendation 2 – Standing in the Aisle.

Standing in the aisles of all moving school buses be eliminated within 3 years.

Sufficient additional subsidy funding be provided to operators to enable them to provide all school children with seats inside this time frame.

Recommendation 3 – Padding Interiors of Buses

Regulations should be immediately introduced into Qld to mirror the requirements of *NSW Technical Specification 148* issued 16 July 1997.⁵⁶ These regulations require all hard objects in buses (such as seat backs, hand-rails and partitions) to be padded.

These regulations additionally require all existing buses used to carry school children to be meet these standards within 18 months.

Recommendation 4 – Three for Two Policy & Seatbelts

Compliance with ADR 68/00 progressively be mandated for all Queensland school buses. This should occur in conjunction with the progressive elimination of the 3 for 2 policy on those routes that introduce seat-belted buses that comply with the ADR.

All new and replacement buses to be used carrying school children comply with ADR 68/00.

⁵⁶ Technical Specification 148 issued 16 July 1997. Also see Motor Traffic Amendment (Bus Safety) Regulation 1997 gazetted in NSW Government Gazette Number 86.

All additional buses introduced to eliminate standees under Recommendation 2 comply with ADR 68/00.

All buses on high risk bus routes (whether carrying standees or not) comply with ADR 68/00 within 3 years.

All buses with low crashworthiness ratings, regardless of age, comply with ADR 68/00 vehicles within 5 years.

All remaining school buses used on roads with speed limits exceeding 60kph comply with ADR 68/00 within 10 years.

Sufficient additional subsidies and incentives be provided to bus operators to enable them to upgrade or replace existing vehicles within these time frames. Many small bus operators are already doing it tough. The government must not seek to transfer its responsibility for the safety of children in the state to operators who are already conducting marginal (and under-subsidized) operations.

Recommendation 5 – Bus Identification & Traffic Calming.

All buses setting down school children must be clearly identified in the manner required by current regulations for 'school buses'.⁵⁷ The current provisions that exempt most bus operators from identifying school buses should cease.

All advertising or other visual clutter should be removed from the rear of any bus that sets down school children. Alternatively, the school bus signs and pictograms should be visually enhanced by replacing them with LED signs of suitable size and luminosity to ensure they stand out within the visual camouflage created by the advertising.

All drivers should be required to 'give way' to children within 25 meters of a stationary school bus. This is not the same as saying that school children should use this as a permit to treat a school bus as a mobile pedestrian crossing (as

occurs in the USA). Instead it merely acknowledges the reality that adult drivers should have far greater responsibility toward child pedestrians than they presently have under the traffic regulations.

Drivers should be required to slow to 20kph when overtaking a stationary school bus. Alternatively, school bus set down zones should be clearly marked on the roadway and special low speed zones, such as that around schools, should be introduced within 75 meters of the approach to any school bus stop.

Resources must be put into educating drivers of the risks associated with passing stationary school buses and speeding past bus stops, particularly in the afternoons following school when children are most excitable and distractible.

Recommendation 6 – Emergency Services.

An audit should be conducted of the capacity of emergency services to appropriately respond to a major school bus tragedy in each high-risk region. Where necessary, additional resources should be applied towards ensuring the police, fire, ambulance and emergency hospital wards in each of these areas to ensure prompt and adequate response to a major bus tragedy.

Recommendation 7 – Bus Collection & Set Down Zones.

All high-risk bus stops should be identified and either relocated or redesigned to ensure the safety of children using the bus stops.

As mentioned in recommendation 5 above, all school bus set down zones should be clearly marked on the roadway and special low speed zones, such as that around schools, should be introduced within adequate distance of the approach to any school bus stop.

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57 Division 18 of Schedule 1 of the *Transport Operations (Road Use Management – Vehicle Standards and Safety) Regulation 1999*