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Overview—*Overview of Research and Practice*, Queensland School Transport Safety Task Force 2001.

Community—*Community Input: Public Submissions and Consultation,* CARRS-Q 2001.

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EXECUTIVE SUMMARY

This final report of the Queensland School Transport Safety Task Force recommends strategies to Government that will improve the safety of students travelling to and from school by road in all areas of the State.

In the six months since it was established in March 2001, the Task Force has reviewed current research and practice, sought community and stakeholder views, and analysed Queensland road crash data. Community interest in school transport safety is high in Queensland, and media coverage of the Task Force's work has been extensive.

Two fundamental assumptions have guided the Task Force's work. The first is that preventing a fatality must pre-empt all other considerations. The second is that school transport involves everyone in the community, and only a whole-of-community approach can achieve optimal safety. For the Task Force, optimal school transport safety means zero fatalities.

In determining priorities, the Task Force identified groups where risks are higher, and areas where consequences would potentially be grave.

In the last decade in Queensland, most school transport-related fatalities have occurred among students in cars, on bicycles and on foot. In addressing these historically higher risk groups , the Task Force has recommended (cost in brackets)

- slower speeds around schools ($1.5 million one-off)
- a comprehensive community awareness and education program ($1 million pa)
- a program to foster partnerships among stakeholders and community members at school level, supported with funding increases to improve school transport environments ($7.55 million pa plus $120 000 one-off costs).

While fewest fatalities have occurred among bus passengers, a serious bus crash could have devastating consequences for a community. The Task Force has noted three types of road environment and has prioritised implementation of safety improvements in accordance with risk. It has recommended

- staged introduction of a comprehensive upgrade of the Queensland bus fleet which will provide easily-identified school buses with rollover strength and padding, and appropriate seat and seat anchorage strength and seat belts in specified environments ($503 million over 15 years)
- support for a proposal already in place to improve bus driver training, particularly in behaviour management
- a Statewide emergency action plan for buses used in school transport.

The Task Force has also made recommendations to improve future monitoring and evaluation of school transport safety throughout Queensland.

The Task Force recognises that it has proposed an ambitious program of reform which will take time to implement but believes that if the program is fully supported by Government and the community, then injuries and fatalities among students travelling to and from school will be greatly reduced. Zero fatalities is an achievable goal.

1 INTRODUCTION

Every week day, the vast majority of Queensland's 600 000 primary and secondary school students travel to and from their schools safely, relying on the complex network of people, vehicles and infrastructure that underpins school transport throughout the State.

In the decade to 2000, there were 65 fatalities among school students travelling to or from school by road in Queensland. These deaths could have been prevented.

The Queensland Government established an independent Task Force on School Transport Safety in March 2001 with a Cabinet-approved brief to

- review current research on school transport safety, including the outcomes of recent studies and the effectiveness of current school transport safety programs
- prepare an interim report analysing international, national and interstate policies and practices relating to school transport, including the use of seat belts on school buses
- consult with stakeholders and community groups and invite public submissions
- make recommendations to Government within six months on priorities for ensuring the safety of children travelling to and from school and implications for the Government and the community.

Membership of the Task Force was

- Dr Cherrell Hirst AO, MB BS, BEdSt *Qld*, DUniv *USC*, FAICD, Director, Wesley Breast Clinic, Chancellor, QUT (Chairperson)
- Mr Garry Cislowski BAppSc (Surv) *QUT*, Lic Surv, President, Queensland Council of Parents and Citizens Associations (QCPCA)
- Mr Graham Davis, Divisional Manager, Brisbane Transport (until August 2001)
- Ms Lorraine Douglas-Smith, Executive Director, Queensland Bus Industry Council
- Mr Alan Druery OAM, BA, BEdSt, MEdAdmin *Qld*, DUniv *QUT*, FQIEA, FACEA, FACE, Executive Director, Catholic Education Commission
- Mr Greg Duck BSc, BEdSt, MEdSt, DipInfProc *Qld*, Manager (School Transport), Education Queensland
- Mr Tony Kursius BA *Qld*, MPubPol *UNE*, Executive Director (Land Transport and Safety), Queensland Transport
- Dr Cliff Pollard BD, MB BS *Qld*, FRACS, FRCS *Edin*, FACS, Queensland Trauma Committee, Royal Australasian College of Surgeons
- Professor Mary Sheehan BA (Psych) Hons, DipPsych *Syd*., PhD *Qld*, FACRS, Director, Centre for Accident Research and Road Safety – Queensland (CARRS-Q), Head of School of Psychology and Counselling, QUT
- Mr Colin Edmonston BA (Psych) Hons *CQU*, Research Officer
- Ms Renae Moore BA (Psych) *Qld*, Research Officer and Secretary to the Task Force.

The Task Force met fortnightly until submission of its first report in July and met weekly from then until completion of its final report on 30 September 2001.

Within the constraints of time imposed by its brief, the Task Force

- conducted a preliminary review of current national and international research in school transport safety
- analysed data on fatalities and injuries in school transport over the decade to 2000 in Queensland and, where possible, compared these with national trends
- examined policies and practices on school transport safety at national and state levels in Australia and internationally.

The results were published in the Task Force's *Overview of Research and Practice* in July 2001.

The Task Force also

- called for public submissions, with 185 received by the closing date of 31 May 2001
- met individually with nine respondents
- met with 25 researchers and practitioners in road safety, road engineering, education, policing, emergency services and the transport industry.

In addition, 50 responses were received to the *Overview of Research and Practice*.

The Task Force met on a total of 22 occasions over the six-month period, including four full-day sessions to conduct interviews with 34 individuals.

1.1 Scope

This report deals with transport to and from school by road—by bicycle, bus, car, motorcycle or on foot—so transport by rail and ferry is not included.

School transport means travel to and from school (the 7am–9am and 2pm–4pm peak hours), so transport on school excursions etc will not automatically be included in the data (although it is included in bus recommendations).

1.2 Identifying risk

In an ideal world, the Task Force would recommend every beneficial change in school transport safety suggested over the six-month period. A notional budget was not included in the original brief, although the Task Force was asked to prioritise its recommendations. Conscious of the cost implications to the community as taxpayers and as consumers of school transport, the Task Force has sought to base its recommendations on risk estimates.

In order to take a comprehensive risk management approach to improving school transport safety, the Task Force would need to know the degree of risk associated with various modes of transport (bicycle, bus, car, motorcycle and on foot), as well as costs associated with various proposals to improve safety. The Task Force is unable to determine the relative safety of various modes of transport because data are not presently collected on the total number of students using each mode nor on the kilometres travelled in each mode. So, for example, cyclists, who have accounted for a third of school transport-related injuries over the last decade (*Overview* p 9), could be at extremely high risk if their total population was small relative to the total populations of other modes of travel, but at lower risk if their population is large. Recommendations regarding future data collection are made in section 5 of this report.

Unable to adopt a comprehensive risk management approach, the Task Force has identified ways to improve safety in those modes of transport that have in the past resulted in more fatalities and injuries overall (pedestrians, cyclists and students in cars), as well as strategies to limit the possibility of potential losses resulting from a rare but potentially grave event, such as a major bus crash.

1.3 Community ownership

Community interest in school transport safety is high in Queensland, as evidenced by the 235 submissions and responses received from students, parents, school communities, education providers, transport planners, bus operators and local government authorities. Media coverage of the Task Force's work has been extensive. There have been almost a thousand visits to the Task Force's website.

While community and stakeholder input is dealt with throughout this report, one issue needs to be mentioned at the outset. The safety of school buses was raised in one form or another in almost all of the 185 first-round submissions to the Task Force and in the 50 responses received to the *Overview of Research and Practice*. Seat belts in particular were raised in 127 submissions, with 109 of these concerned that school buses do not currently have seat belts. This is a significant expression of the will of the community.

The level of public concern and interest in school transport reflects a broadly based readiness to take responsibility for the safety of students as they travel to and from school. The Task Force recognises and commends the Government-sponsored road safety campaigns which have resulted in the progressive reduction of the numbers of fatalities on Queensland and Australian roads. The Task Force's support for these programs is unqualified, but more needs to be done. It is unacceptable that children and young adults—many of them school students—are still being killed and injured across the State.

The Task Force endorses the Australian Road Research Board's goal to reduce the total number of child fatalities associated with school bus travel to zero by 2005 across Australia (*Overview* p 4). The Task Force was directed by a similar goal for Queensland, to reduce the total number of fatalities to zero across all modes of school transport—bicycle, bus, car, motorcycle and on foot.

In six months of deliberations, the overwhelming view the Task Force has formed is that school transport safety depends on commitment from everyone in the community, individually and collectively. The challenges

confronting students, and young children in particular, as they travel on and across ever-busier, more crowded and faster-moving traffic situations, are increasing daily. Their safety involves us all, in roles as diverse as drivers around schools, transport planners, policy-makers, school educators, police, bus operators, parents and carers.

Any changes to school transport safety at a systemic level will have financial and other costs, which will be passed on to parents and parent organisations, school administrators and authorities, governments, bus operators and the wider community—even those who see themselves as currently and historically uninvolved.

Ultimately, these costs need to be seen in the context of a fundamental goal to reduce to zero the number of school transport-related fatalities in Queensland.

1.4 Timeframes

Throughout its deliberations, the Task Force has worked to ensure that the interests of students travelling to and from school have been paramount. The recommendations made and the strategies suggested in this report seek to optimise safety. In some instances, logistical implications may mean that it will take time for some recommendations to be fully implemented.

School transport in Queensland operates in a heterogeneous system comprising people, organisations and infrastructure that has developed organically over many decades. The system as it stands relies on the strategic planning and quality assurance processes in place within its various constituents. There is no overall strategic plan, no coordinating body accountable for implementing strategic plans, and no provision for systematic evaluation of performance against plans. This can lead to a lack of internal cohesiveness. Moreover, recommendations which might work in one situation or constituency will not necessarily work in others. This has been a frustration for the Task Force in terms of trying to make general recommendations for the system as a whole.

The inherent heterogeneity of the current system makes blanket safety solutions impossible, and recommendations have been made based on the following principles.

- Improvements will need to be introduced over time, and timeframes will be as long as 10 or 15 years in some areas, simply because of the extent of change required.
- Resistance to change is strong in some areas, although community submissions indicate a wider community climate which signifies a readiness for change.
- The principle underpinning change must be risk management based as far as possible, making greatest and urgent changes in areas of highest perceived risk.
- Cost cannot be ignored as any public money spent on school transport is money not spent on other community services and safety programs.
- To achieve change, Government, key stakeholders and the community must work together.

1.5 Report structure

The remainder of this report is devoted to presenting the Task Force's recommendations under the following headings

- **Safe school zones**
- **Safe communities**
- **Safe buses**
- **Evaluation and monitoring.**

All recommendations are to the Queensland Government through the Minister for Transport and Minister for Main Roads. A broad costing, provided by Queensland Transport and qualified where necessary, is provided with each recommendation.

Under each heading, key findings precede recommendations, and often refer to

- the *Overview of Research and Practice*, appended and referred to in this report as ***Overview***
- the summary of community and stakeholder submissions, appended and referred to in this report as ***Community***
- the summary of interviews with researchers and practitioners, appended and referred to in this report as ***Practitioners***.

Two fundamental assumptions have guided the Task Force's work. Firstly, *the welfare of children is paramount*; preserving young lives has taken precedence over all other considerations for the Task Force. Secondly, to make school transport safer, *everyone in the community will have to do at least a little, and some members of the community will have to do a lot.* It is on the basis of these two assumptions that the recommendations of this report are made.

1.6 Acknowledgments

Over its six months, the Task Force met with school educators, bus operators, transport planners, road safety and education researchers, parents, students and interested people in the community. The Task Force appreciates the contribution of all of these people to its work, particularly their frank discussion of relevant issues.

The Task Force also acknowledges the 235 individuals and groups who prepared detailed submissions and responses which have informed the recommendations and preparation of this report. This level of commitment and dedication among many sectors of the community augurs well for the development of partnerships which can improve school transport safety at every level.

The Centre for Accident Research and Road Safety – Queensland (CARRS-Q) provided research support and prepared the summaries of community submissions and research and practitioner interviews which are appended to this report. The Task Force appreciates the time and effort devoted to school transport safety by the Centre and its dedicated staff.

To conduct community consultations, gather submissions, interview researchers and practitioners, discuss findings, understand the complex world of school transport and produce two reports, the Task Force has been ably assisted by dozens of people whose efforts are much appreciated.

2 SAFE SCHOOL ZONES

These recommendations provide an opportunity for all drivers to make a real contribution with minimal effort to the safety of students travelling to and from school, and will improve community awareness of school transport safety issues.

The recommendations carry a cost for drivers in terms of slower speeds in school zones. The Task Force appreciates that this is a small pain for all drivers, and stresses that it represents a large gain for the safety of young students.

2.1 Key findings

Student cyclists and pedestrians accounted for 26 of the 65 school transport-related fatalities and nearly two thirds of the hospitalisations in Queensland in the decade to 2000 (*Overview* p 9). Of the 10 fatalities in bus transport, 9 were among **bus pedestrians**, walking on their way to or from a bus when hit by another vehicle.

Research shows that **younger children** (under 10-years-old) have not developed the necessary perceptual skills to judge speed and distance. This puts them at greater risk in a road environment (*Overview* p 14).

Students in cars accounted for 29 of the 65 school transport-related fatalities in Queensland in the decade to 2000, and nearly a third of the hospitalisations (*Overview* p 9). Most were secondary school-aged students.

Concerns about the behaviour of **drivers around schools** were raised in 12 submissions. The safety of the road environment around schools was raised in 19 submissions (*Community* p 9).

Research suggests that, generally, **speeds need to be below 30kph** for adult pedestrians to have a chance of avoiding serious injury in a crash. If an adult pedestrian is struck at a speed of 50kph, they are eight times more likely to sustain fatal injuries than if struck at a speed of 30kph. For child pedestrians, the speed at which they are likely to sustain fatal injuries is lower (*Practitioners* p 3,11). Scandinavian countries set school zone speed limits at 25kph and have lower child fatality and injury rates (*Overview* p 17).

Up to a third of the student pedestrians and cyclists killed in school transport were in the immediate vicinity of their schools when they were struck (*Overview* raw data), and **the school environment** remains an intense concentration of sometimes very young children, buses, cars and road hazards in a confined space. The potential risk is high.

Currently in Queensland, **School Zone speed limits** are set at 40kph, 60kph or 80kph, depending on the usual speed in the area. School Zone limits apply during morning and afternoon travel periods that vary from school to school. They apply only on school days (*Overview* p 17). A number of submissions pointed to the need for enforcement of School Zone speed limits (C*ommunity* p 9).

Advice from road safety researchers (*Practitioners* p 2) suggests people do not always notice speed limit signage. Some local government authorities and school communities have installed **traffic-calming** around schools, including threshold treatments[1] , which provide a visual and auditory trigger to drivers. Research shows that threshold treatments increase driver awareness of the School Zone and the need to slow down (Brisbane City Council, 2001). Queensland Transport is currently developing *School Environment Safety Guidelines* for schools which will include guidelines for threshold treatments. A number of submissions pointed to the need for appropriate traffic-calming solutions around schools (*Community* p 10).

2.2 Conclusions

The Task Force found overwhelming evidence to support a lower speed limit around young children.

The Task Force's view is that a speed limit of 25kph would be optimal for safety. A 25kph limit is not possible under national standards which recommend speed limits be in bands of 10kph. The Task Force sees 30kph as a compromise which will meet this requirement but remains committed to the lower speed limit of 25kph if possible.

To maximise safety, the Task Force is strongly of the view that all School Zones should be at the new limit of 30kph. Standard road engineering practice will not support a drop in speed of more than 20kph in one hit as this can increase rather than reduce crash risk (*Practitioners* p 20). Many Queensland schools are on major (60kph or faster) roads. If their permanent speed zone were reduced to 50kph,

[1] Threshold treatments are the coloured bands on either end of some School Zones.

the reduction in speed would be no greater than 20kph. In cases where permanent speed zones remain above 60kph, the Task Force sees road-crossing solutions as imperative. Mechanisms such as median strips and pedestrian refuges need to be provided on major (four-lane) roads.

The speed limit reduction around schools will have the added benefit of concentrating every driver's mind on the issue of school transport safety and the risks to student pedestrians and cyclists. Enforcement will also need to be stepped up to ensure compliance with the new limit. Road safety researchers pointed out that effective enforcement is a key contributor to ensuring School Zones are safe (*Practitioners* p 8).

Currently, School Zones operate on school days in specified morning and afternoon peak travel times which vary from school to school. This does not reflect the increasing flexibility of contemporary schools where students move in and out of the school environment throughout the day. In the current system, drivers must be aware of time of day, day of week and week of year in addition to the driving task when deciding to slow down. A simpler, blanket daylight hours School Zone will be easier for drivers to comprehend and schools to manage.

Signage for new speed limits needs to be conspicuous, with appropriate forewarning. Current practice is to provide repeater speed limit signs to remind drivers. It is estimated that changing signage across Queensland will cost $1.5 million.

The addition of threshold treatments comes at significant cost. At $8000 for two treatments, it would cost $16 million to treat one road for every school in Queensland. When this cost is taken into consideration, it could be argued that the treatments are not essential in cost-benefit terms and that the $16 million might be diverted to other recommendations. At the same time, the Task Force recognises the benefits provided by traffic-calming, and encourages school and local government authorities to work together to improve their school environments. Recommendations made later in the report under Community Partnerships (section 3.3) propose increased State funding to help schools and local communities.

2.3 Recommendations

The Task Force recommends that the following program to modify the current system of School Zones be commenced on 1 July 2002 and completed by 30 June 2004:

- School Zones to be limited to 30kph wherever possible;
- for schools on roads with permanent speed zones of 60kph, a permanent speed reduction to 50kph to be implemented in order that the drop in speed to 30kph is no greater than 20kph;
- schools which remain in School Zones that are in permanent speed zones of >60kph to have supervised or signalised crossings (starting with primary schools);
- School Zone speed limits in Queensland to apply between the hours of 7am and 5pm on all week days of the year;
- where they have not already done so, schools and local government and road authorities to consider adopting traffic-calming devices such as threshold treatments in School Zones.

Estimated cost of new speed limit signage: +$1.5million, one-off, based on full implementation in every school in Queensland.

Estimated cost of new supervised or signalised crossings: Individual schools that fit this category are yet to be identified, so costings are yet to be determined.

3 SAFE COMMUNITIES

The overwhelming conviction of the Task Force is that school transport safety is a whole-of-community problem that requires whole-of-community awareness and commitment to ensure the success of solutions.

School transport safety reaches everyone—the safe driver carrying students or driving around schools, the school community organising safe walking and cycling routes, the parent or older sibling who models good pedestrian behaviour for a young child, and the government department head who decides where money is best spent to improve rural bus routes. Change in the knowledge, understanding and behaviour of all these people will do more to improve safety in school transport than any single initiative.

The Queensland community is already keenly interested in school transport safety, as evidenced by the large number of submissions to the Task Force and by the media and community interest in the Task Force's work. Many people are concerned about various aspects of school transport safety and are ready and willing to do their part to create safer communities.

During its deliberations, the Task Force was presented with a number of highly innovative programs in school communities, some of which are mentioned later in this report. Much more could be done to harness community engagement with school transport safety. No one would doubt that community determination and effort can effect change. The Clean Up Australia Day initiative, Neighbourhood Watch and Local Community Planning Groups in some cities demonstrate what local communities can achieve.

The recommendations in this section deal with

- community awareness through a sustained and issue-focused media and education campaign
- community partnerships through a new scheme to engender the formation of involved and interested groups who can act as key leaders of community-based programs for school transport safety.

It is intended that the Task Force's recommendations will establish benchmarks towards which every school community can work. Where possible, school communities and local government authorities are encouraged to provide resources to change school environments to enhance safety. At the same time, the Task Force recognises that, in some areas, large-scale public resourcing is needed to make school transport safer. The recommendations here include program funding which can be harnessed by school communities to effect real changes in their student travel arrangements and environments.

3.1 Key findings

Primary school-aged children accounted for most of the school transport-related fatalities and injuries among **student pedestrians**, **cyclists** and **bus pedestrians** in the decade to 2000 in Queensland (*Overview* p 10). Research suggests that younger children (under 10-years-old) have not developed the necessary perceptual skills to judge speed and distance. This puts them at greater risk in the road environment (*Overview* p 14). Parents and carers often overestimate a young child pedestrian's skills (*Practitioners* p 10).

Student pedestrians and cyclists are more likely to be killed or injured travelling in the **afternoon** than in the morning (*Overview* p 11).

Younger student pedestrians and cyclists need to be **accompanied by someone older** on their way to and from school. This was strongly reinforced by educationalists and road safety researchers who met with the Task Force. One road safety researcher saw this as the single change which could do most for improving school transport safety (*Practitioners* p 8,10).

Community concerns about the safety of student pedestrians (n=11) and cyclists (n=9) were raised in a small number of submissions compared with other safety issues (*Community* p 11). Community awareness of the risks involved in these modes of transport needs to be improved.

Training and modelling rather than information-only education programs are more effective in shaping child pedestrian behaviour (*Overview* p 15). Educationalists suggest that programs like "commentary walking", where parents explain while modelling safe pedestrian behaviour, work well to improve a child's awareness of pedestrian safety (*Practitioners* p 10).

Of the 29 school transport-related fatalities among **students in cars** in Queensland in the decade to 2000, 25 were passengers and four

were drivers (*Overview* raw data). Road safety researchers advised the Task Force that, for adolescent drivers, risk increases directly with the number of adolescent passengers carried (*Practitioners* p 11). This is supported by US research (MacNeil, 2000). Of 29 students killed in car crashes, at least four were not wearing seat belts (*Overview* raw data). Research shows overwhelmingly that risk of fatal injury is mitigated by seat belts in cars (Daffner et al., 1988; Healy, 1997). Some schools, including Carmel College, have safety rules for cars in school zones and students driving to school (*Community* p 12). The Queensland Transport **Speed Awareness Program** (*Overview* p 19) provides opportunities for school communities to help drivers check their own speeds as they pass schools, as an adjunct to police enforcement of School Zone speed limits.

In the decade to 2000, 147 17-year-olds were killed or injured in car crashes in Queensland (*Overview* p 10). Data on whether they were being driven by other students were not available.

Head injuries among **cyclists** have decreased since legislation was introduced to mandate helmet-wearing in 1991 (*Overview* p 16).

Student behaviour on buses was raised as an issue in 22 submissions. Most stressed that bus drivers should not be responsible for student conduct. Some suggested transport monitors on buses, or video cameras on problem runs (*Community* p 10). Some schools have an identified officer responsible for bus transport or an active bus conveyance committee (*Community* p 10,12).

Concerns about safety in school transport by bus were raised in most submissions to the Task Force (*Community*). **School bus routes and stops**, particularly in rural and remote areas, were raised as an issue in 45 submissions (*Community* p 9). Of 65 school transport-related fatalities in Queensland in the decade to 2000, 9 were **bus pedestrians,** struck by other vehicles on the way to board or after alighting from a bus. Most were in non-metropolitan areas (*Overview* raw data). This is consistent with national data (*Overview* p 11). No bus pedestrians have been killed in Queensland since 1995 (*Overview* raw data). A key difficulty in rural and remote areas is that bus stops are sometimes located outside individual properties, and moved as frequently as families change or move (*Practitioners* p 14). Safety of children alighting from a bus is not always considered when these changes occur.

Queensland's **Safe School Travel (SafeST) Package** provides a framework in which some school communities have chosen to play a special role in the development and implementation of school transport safety strategies. The key programs of the SafeST Package are the Safe School Bus Routes Program and the SafeST Subsidy Scheme described below, the Safe Walking and Pedalling Program, the Speed Awareness Program and the School Crossing Supervisor Scheme (*Overview* p 19).

Queensland Transport's **Safe School Bus Routes** program has been reviewing a minimum of 15 bus routes per year since 1997, prioritising its work according to road safety criteria. Only five per cent of the 2000 routes have been reviewed so far (*Overview* p 21).

Queensland Transport's **SafeST Subsidy Scheme** provides funding on a matched basis with local government authorities to carry out large-scale infrastructure around schools such as bus bays, pick-up and set-down areas, or pedestrian and cycle paths.

3.2 Raising community awareness

Raising community awareness of school transport safety issues has the potential to change driver, parent, teacher and student behaviour. In addition, local community involvement must be nurtured through appropriate programs and infrastructure.

3.2.1 Conclusions

The critical role the media plays in achieving community understanding, involvement and ownership of school transport safety cannot be overestimated. Every effort must be made to achieve a partnership in which the media works with other sectors of the community to improve school transport safety. Media organisations can see this as a part of their professional ethical responsibility and become involved in ways beyond mere commercial or business interests.

The creation and implementation of an innovative, compelling and broad education program focusing on the key elements of school transport safety and targeting multiple groups is fundamental to achieving whole-of-community involvement in solutions. This will include those groups who already see themselves as involved in school transport as well as those who do not yet see a personal link to the issue and its strategies for improved safety.

In order to be successful, a community education program will need to be

- sustained over the long term
- run regularly—perhaps two weeks at the beginning of every school term to reinforce "back to school" community thinking
- associated with risk periods such as Easter
- coordinated with key stakeholders including schools, education providers, parent organisations, Queensland Transport and the Queensland Bus Industry Council
- run across print and broadcast media throughout State, regional and local zones, and nationally where appropriate
- targeted to multiple sectors of the community in both rural and urban areas.

Preliminary cost estimates suggest a comprehensive, multi-media campaign (including television) could be mounted for around $1 million per year.

Ideally, the media campaign would be complemented by a number of smaller education initiatives implemented by key stakeholders. The notion of a school transport community partnerships program recommended in section 3.3.2 would be an ideal place to locate responsibility for local community education initiatives. Partnerships in every school community could integrate a broad safety education component into the school induction process which would help to ensure that, prior to the school year, students and parents are made aware of their roles in providing a safe environment. Coordination and cooperation between the umbrella community education program and local media activity in terms of timing, approach and content will be essential for long-term success.

An education program will require commitment from several Government departments and external organisations. High profile individuals such as sporting personalities could also play an important role in providing community leadership and adding weight to a coordinated campaign.

The Task Force continues to be concerned about the number of fatalities among students travelling by car to and from school. Most of these (25 of 29, *Overview* raw data) were passengers, and the importance of general road safety campaigns to encourage safe driving cannot be overemphasised.

3.2.2 Recommendations

The Task Force recommends:

(i) that the Queensland Government, through relevant Departments and with the involvement of all stakeholders, develop a community awareness strategy on school transport safety; and

(ii) that the strategy have as its central platform an effective and sustained education and media campaign to generate and improve awareness of the issue of school transport safety, that addresses at least the following messages:

- Everyone is involved in school transport and responsible for the safety of school students. Everyone can assist in improving safety (zero fatalities).
- Drivers around schools need to slow down.
- Student drivers and passengers must wear seat belts.
- Student cyclists must wear helmets.
- Younger (under 10-year-old) student cyclists and pedestrians (including bus pedestrians) should be accompanied by someone older on the way to and from school.

Total cost: +$1 million pa.

3.3 Fostering community partnerships

Raising community awareness of school transport safety issues is a first step to changing behaviour. In addition, local community involvement must be nurtured through appropriate programs and infrastructure.

The Task Force found well-developed management systems and pockets of excellence in community-based safety programs in a number of school communities (*Overview* p 20). At Carmel College in Brisbane, there are two nominated administrators with school transport responsibilities, one of whom manages bus transport in close liaison with the servicing bus operator, and the other of whom manages a strictly enforced policy on student drivers (*Community* p 12). In the Gap Cluster of schools in Brisbane's west, an annual Red Sneaker week targeting school transport safety improves community awareness at the local level and highlights the benefits of safe walking and cycling programs (*Overview* p 20).

Conondale State School's SafeST Committee was awarded the Queensland Road Safety Award (School Community Category) in 2000 and 2001. The school has an active bus conveyance committee and parent organisation that work closely with the local bus operator and have successfully lobbied government to review and improve the safety of bus routes in the area (*Community* p 10).

Facilitating community partnerships in every school community will achieve much in school transport safety, and is the only initiative which can address every single mode of transport and region of the State.

3.3.1 Conclusions

Based on the fundamental view that whole-of-community involvement will achieve most for improved school transport safety, the Task Force believes all stakeholders need to be encouraged to participate in and take responsibility for safety in all school communities. At the local level, stakeholders would include, depending on the school and its environment, staff, students and their families, local bus operators and drivers, interested community members, police, emergency services providers and State and local government road, transport and other authorities. Clubs and societies such as Lions, Rotary and Apex, and Neighbourhood Watch and other community groups, as well as retirees and unemployed people, could also be involved. A mechanism is needed to harness and gather up the goodwill of all these people.

At the same time, all the goodwill in the world will not achieve major changes in infrastructure and other areas without the resources to bring about change. Increased funding to specific programs within the Queensland Government's SafeST Package to ensure community partners can make changes is an integral part of improving school transport safety at the school community level.

Currently, individual programs within the SafeST package, other than the Safe School Bus Routes Program, are introduced at the request of individual schools. This relies on a proactive school community. Conveyance committees operate in many school communities but these are only involved in transport by bus and often only include bus operators and parents in their membership. Parents of students who travel by other modes are excluded, as are other stakeholders. There is a need for a proactive, central agency to facilitate change.

Safe school bus routes and stops are a major issue, particularly in rural and remote areas. Concerns were raised in community submissions and in Task Force discussions with researchers and practitioners (*Community* p 9, *Practitioners* p 2). The Task Force recognises that the siting of bus stops on rural and remote routes needs to be subject to local needs, but strongly supports the Queensland Department of Main Roads *Guide for Rural School Bus Routes and School Bus Stops* (*Overview* p 21) adopted in 2001. Sites for bus stops should not be transient, and bus stops should be properly constructed and placed in safe positions off the road so that vehicles may pass safely.

Discussion with road safety researchers (*Practitioners* p 11) pointed to the increased crash risk when young drivers carry young passengers which is a more and more common scenario in school transport. The Task Force noted that some schools, including Carmel College, have policies in place requiring parental permission for students to drive other students to and from school (*Community* p 12). Such proactive management of risk is strongly supported by the Task Force.

The identification of a responsible officer in every school community as a student transport safety coordinator who could manage students driving to school would help to ensure a continuing focus on school transport safety within the community. At the same time, individual officers can only achieve so much. There also needs to be a process through which everyone in a local community can become engaged in school transport safety.

Many schools have student transport management plans that deal in part with behavioural issues (eg Carmel College, *Community* p 13). These plans provide a means for school communities to deal with specific behavioural problems including breaches of the *Code of conduct for school children travelling on buses* (Queensland Transport, 1999). It is important that development of student transport management plans be informed by all relevant stakeholders including parents, students, teachers and bus drivers, and incorporate all modes of transport.

CARRS-Q and Queensland Transport are currently trialling a web-based community resource called Pathways. This package, located at QUT, brings together the expertise of emergency services, police, schools and community leaders to provide individual communities with the knowledge, resources and contacts to address road safety problems

from a whole-of-community perspective. Such a scheme might tie into a school transport-focused community partnerships program.

Working within the parameters of existing programs, and with a model developed by a central facilitating agency, a community-based action group could achieve much at the local level to improve the safety of students, including

- media promotion relevant to the local community and in conjunction with the Statewide campaign
- proposals for siting of bus stops on rural roads
- organisation of "walking bus" and "bike train" initiatives
- a program of "safety monitors" or "bus lifeguards" who travel on buses and deal with or report behaviour issues to designated school staff
- local community campaigns and events to promote safety, in liaison with Queensland Transport, education providers and Queensland Police
- coordination of training of younger children on road-crossing, alighting from buses etc involving teachers, bus drivers and parents
- supervision and "meet the bus" programs for young school travellers
- school "buddy system" programs.

The Task Force acknowledges that community partnerships will need operational leadership from Queensland Transport and education providers. There may also need to be a more independent and high-profile voice within the community that can continue to highlight the need for community awareness and commitment to effect change. A temporary Task Force can only achieve so much to highlight an issue. Unless school transport continues to be championed, it runs the risk of being swallowed into broader safety campaigns which will not necessarily address the specific situations in which children and young adults travel to and from school.

While the Task Force has no wish to create layers of bureaucracy, a small leadership group responsible to the Minister for Transport could do much to continue to ensure this key issue has an appropriate community profile.

3.3.2 Recommendations

The Task Force recommends:

(i) that the Safe School Travel (SafeST) Package be expanded to provide funding and infrastructure support for a new community partnerships program through which all stakeholders in every school community are encouraged and empowered to take responsibility for local school transport safety activities (+$3 million pa);

(ii) that the community partnerships program, once established, implement a regular (at least three-yearly) review process in which every school community in Queensland conducts safety reviews of the school road environment using a tool such as the SafeST checklist to identify non-optimal situations and practices, with the first round of reviews commencing no later than July 2002;

(iii) that specific existing SafeST Programs be upgraded to reach the following targets:

- SafeST Subsidy Scheme: Increased funding to provide remedial treatments for issues identified in the process outlined in recommendation (ii) above (+$3 million pa, matched 50/50 with local government authorities);
- Safe Walking and Pedalling: Increased funding for infrastructure to improve cycling/walking pathways identified in the process outlined in recommendation (ii) above, as well as targeted funding for "walking bus", "bike train" and other schemes which ensure that younger cyclists and pedestrians are accompanied by someone older (+$1 million pa);
- Safe School Bus Routes Program: Increased funding to double the current program to review and provide remedial funding for 30 routes per year (+$550 000 pa);
- Speed Awareness Program: Increased funding to double the number of current speed awareness devices to 40 (+$120 000 one-off);

(iv) that the following guidelines be passed on to the new community partnerships program as an initial list of key process and information issues:

- An individual, probably a teacher or administration officer within each school community, should be identified as the Student Transport Safety Coordinator, with responsibility for overseeing school transport safety, including students in cars, student pedestrians, student cyclists and student bus passengers;
- Parents and others should show as well as tell young student pedestrians how to stay safe on and around roads;
- Primary school-aged student pedestrians and cyclists should be accompanied by someone older on the way to and from school. This can be achieved through "walking bus" and "bike train" schemes, as well as by parents, older siblings or carers accompanying children;
- While cycling has many health and fitness benefits, student cyclists should be encouraged to ride on dedicated bikeways not roads. Younger cyclists should be encouraged to ride on footpaths where this is permitted, with due care;
- Student cyclists must wear safe[2] helmets correctly, as required by law;
- Parents and other drivers of students must ensure student passengers wear seat belts correctly, as required by law;
- Parents and other drivers should adopt safe and responsible practices when picking up and dropping off student or parking in the vicinity of schools;
- Student drivers (and motorcycle riders) should not carry other students as passengers without the written permission of the parent of the student passenger and the parent of the student driver/rider;
- Bus safety is complex, and when schools are hiring buses, they should consider the safety benefits of rollover strength, seat and seat anchorage strength, padding and seat belts, and the environment in which the bus will operate;
- Use of transport safety websites should be encouraged, and at least one of these needs to provide a Frequently Asked Questions (FAQ) section to dispel widely held myths and misinformation about school transport safety;

(v) that school authorities be requested to require each school to develop, within two years of July 2002, a policy on student transport safety, the behavioural aspects of which are linked to the school's behaviour management plan; and

(vi) that the Queensland Government establish a small group with an interest in school transport safety, responsible to the Minister for Transport, with a brief to promote and support the community awareness and community partnerships recommendations of this report.

[2] As per Australian Standard: AS/NZS2063.

4 SAFE BUSES

4.1 Introduction

The Task Force has formed the view that the safety of students on buses can be enhanced by the use of easily identified buses with rollover strength and padding, and appropriate seat and seat anchorage strength and seat belts in specified environments.

Bus transport is the means by which many of Queensland's school-aged population travel to and from school. Almost a fifth (105 000) of Queensland's school students are funded by the Queensland Government under the School Transport Assistance Scheme (STAS), and the total number of students who use buses is even higher (*Overview* p 9). For some students, particularly in rural and remote communities, the school bus is the only option for travel to school. In such circumstances, the maintenance of a viable and safe school bus system for Queensland is as important as the maintenance of a school system.

Queensland data show fewer fatalities among bus passengers than in any other mode of transport. The Task Force acknowledges community concerns about the possibility of a rare but potentially grave event, a major school bus crash, and would wish to ensure that safety continues to play a major role in shaping the school bus industry in Queensland.

Nowhere in the school transport system is the heterogeneity of elements more acutely present than in transport by bus. School transport by bus relies on a myriad of small and large bus operators and Commonwealth, state and local government authorities and their legislative provisions and design standards. Responding to particular pressures in one part of the system to provide a safety benefit can have negative consequences for other parts of the system. For example, an expensive new safety requirement, if passed directly on to bus operators, could force a small operator out of business and leave a community without a school bus.

The Task Force is acutely aware of concerns about the issue of safety in bus transport and particularly the strong views expressed by community groups and in the media that seat belts simply must be fitted on all buses carrying school students whatever the cost. The general issue of bus safety was raised in almost all of the submissions to the Task Force, and concern that school buses do not have seat belts was the issue most frequently raised (*Community* p 6,8). Some popular media have treated this as the single issue on school transport safety, to the detriment of responsible reporting of facts.

The Task Force has worked hard to ensure that its findings and recommendations are based on the whole picture of school transport safety, taking into account the relevant data, the current research, and the views of all stakeholders and of the wider community. Bus safety is not simple, and one change such as the introduction of seat belts will achieve few safety benefits without others such as rollover strength, and seat and seat anchorage strength.

One view, expressed by the Australian Medical Association (Queensland) and health and law enforcement practitioners who met with Task Force (*Practitioners* p 6,19), is that people are more likely to adopt safe road user behaviour in one form of transport if they adopt it in another, so seat belts in buses would have an added benefit of encouraging people to wear seat belts in cars. This stems from public health research which suggests that adoption of one preventive health strategy leads to acceptance of others.

4.2 Key findings

The **school transport bus industry**, which is largely funded by the Queensland Government and, in some cases, by fare-paying passengers, comprises 2449[3] buses owned by 1010 private and local government operators (*Overview* p 22). More than half are single bus operators, and many are in very small businesses. Queensland's School Transport Assistance Scheme (STAS) funding and fares are lower than all states except South Australia and Tasmania. The Queensland fleet is one of the oldest in Australia, with an average age of 18 years among dedicated large school buses (*Overview* p 22). Even without the establishment of an independent Task Force, over a quarter of the State's school transport buses will have to be replaced or upgraded in the next five years under the bus replacement policy.

The **School Transport Assistance Scheme** (STAS) provides funding for student transport to and from school, mainly for transport by

[3] Based on Queensland Transport (2001) Census. A subsequent survey has revealed that the number of buses is actually much higher (up to 3500).

bus. Eligibility is primarily based on distance. Primary school students must live more than 3.2km from the closest state primary school, and secondary school students must live more than 4.8km from the closest state facility *(Overview* p 9). The STAS payment is made to the operator, except in a small number of cases where parents are paid conveyance allowances.

Bus passengers face greatest risk of injury if a bus rolls over in a crash, or if a bus collides with another heavy vehicle at high speed (*Overview* p 25, *Practitioners* p 2). At the same time, in a bus collision, impact energy is still less than half the impact energy of a car crash at the same speed (*Practitioners* p 2). Although only one of the students killed in school transport-related crashes in Queensland in the decade to 2000 was a bus passenger (*Overview* p 9), the total number of fatalities across all modes of transport (65) is a small absolute number. One serious crash between a bus and another heavy vehicle on a high-speed road could dramatically alter any conclusions drawn from the Queensland data.

Rollover strength,[4] mandatory for all buses built since 1993, prevents the collapse of the internal space of a bus in the event of a rollover crash and provides a significant safety benefit for passengers if a bus rolls over (*Overview* p 25). Over three quarters of the buses currently used in school transport in Queensland were built prior to the introduction of the rollover strength design rule (*Overview* p 22).

Seat and seat anchorage strength[5] work to ensure seats don't break free or collapse in a serious crash. New requirements for seat and seat anchorage strength came into effect with the Australian Design Rule for fitting seat belts to buses. The rule applies to long distance coaches built after July 1994. For other buses, there are minimum seat and seat anchorage strength requirements set out in a 1988 Australian Design Rule.

Seat belts[6] were by far the most common issue raised in submissions to the Task Force, and 109 of the 127 respondents who raised the issue were concerned that school buses do not have seat belts (*Community* p 8). Bus operators and transport planners questioned the effectiveness of seat belts (*Community* p 8). Seat belts are not currently required on buses used in school transport[7] in any state of Australia (*Overview* p 25), and they have not generally been regarded as a cost effective measure for bus transport because of the high cost relative to the low risk of a serious crash (*Overview* p 26 and *Practitioners* p 7, 8). Lap-sash style seat belts present safety benefits for passengers in a crash in which a bus collides at high speed with another heavy vehicle. The safety of lap style seat belts is questionable, and some research suggests they may increase head injury in a crash (*Overview* p 26). In the US, where seat belts have been fitted on school buses in some states, usage is low and vandalism is a problem (*Overview* p 15).

The Australian Design Rule (ADR 68/00) which deals with fitting seat belts to buses specifies a minimum distance between shoulder and lap points which is based on the size of an average adult male. There is conflicting evidence about safety benefits for **small children (<25kg) in adult seat belts**, with research pointing to an increased risk of neck injury (*Practitioners* p 6). For this reason, booster seats and harnesses are recommended for small children in cars. Concomitant with the implementation of any scheme to introduce seat belts into buses for school transport, it will be necessary to provide a safety-tested design solution for small children wearing seat belts in buses. The Task Force was presented with one innovative solution which would also accommodate three-for-two seated passengers (*Practitioners* p 13).

Rollover strength, seat and seat anchorage strength and seat belts work together. Seat belts will not necessarily protect passengers in a pre-rollover strength bus (*Overview* p 26). Seat belts are of little value if seats collapse or break free in a crash because of inadequate seat and seat anchorage strength (*Overview* p 26). A Federal Office of Road Safety analysis of 23 long distance coach crashes pointed out that in many of the crashes, the number of fatalities and injuries could have been substantially reduced by the combination of a number of safety features including rollover strength, seat and seat anchorage strength, padding and seat belts (Smith, 1998).

Impact-absorbing padding, as per the current Queensland standard, protects passengers in a crash, especially from head and neck injuries It is estimated that up to 60 per cent of the

[4] ADR 59/00, mandatory for heavy buses built post-July 1992 and light buses built post-July 1993.
[5] ADR 68/00 requires appropriate seat strength, seat anchorages and seat belt anchorages for buses fitted with seat belts, along with child restraint anchorages.
[6] ADR 68/00 sets out requirements for new buses to be fitted with seat belts. Seat belts can also be retrofitted to buses under the *Guidelines for Voluntary Modification of Existing Buses and Coaches to Improve Occupant Protection*, but these are lap style belts not lap-sash style belts.
[7] Unless the buses are otherwise required to have seat belts, eg. long distance coaches built since July 1994.

Queensland fleet may already have padding. (*Overview* p 25). In North America, school buses are designed using the principle of compartmentalisation, which includes high-backed seats and padding to protect against injury and ensure the individual remains in the seat space in a frontal collision (*Overview* p 25). One road safety researcher identified compartmentalisation (the combination of seat height, strength and padding) as a top priority for improving bus safety (*Practitioners* p 12).

Standees (passengers forced to stand because there are no seats available) are allowed in all Australian states in buses designed to carry them[8]. In Queensland, they cannot be carried more than 20km in one journey (*Overview* p 24). Concerns about overcrowded buses (n=19) and/or the safety of standees (n=45) were raised in over a quarter of submissions (*Community* p 8). Research on whether standees are at greater risk than seated passengers in a serious crash is limited because of the small number of serious crashes involving buses carrying standees (*Overview* p 24). Some road safety researchers suggested to the Task Force that standees, especially those at the front of the bus, were at greater risk than seated passengers (*Practitioners* p 4). Standee practices would have to be discontinued on buses with seat belts.

Three-for-two seated passengers (must be under 12-year-olds) are allowed in all Australian states but not in the ACT. Concerns were raised about the safety of three-for-two seating in 11 submissions (*Community* p 8). Research in 1993 found no evidence that three-for-two seated passengers were at greater risk than other passengers (*Overview* p 24). A number of innovative seat manufacturers are working on new seats (at least one is currently in prototype) which would serve for three seat-belted younger students (two lap-sash and a middle harness) or two seat-belted older students or adults (*Practitioners* p 13).

Identification of school buses is regulated in all states. In Queensland, dedicated school buses must use flashing lights and warning signs. Current regulations do not require all operators carrying students to fit lights and signs (*Overview* p 27). Queensland Transport has trialled the use of high-visibility yellow and orange strips on buses carrying school students in rural and urban areas (*Overview* p 28).

Road safety researchers raised the importance of tyres in ensuring bus safety and the potential dangers of retread tyres (P*ractitioners* p 12). While data were not available on operator practices in Queensland, the Queensland Bus Industry Council published a comprehensive review of tyres and safety in 2000. The majority of Queensland bus operators do not use retread tyres.

[8] Route service omnibuses.

4.3 Prioritising change

The Queensland bus fleet can be categorised by the level of risk of the environment in which a bus operates:

Bus classification by operating environment

Environment 1	Environment 2	Environment 3
Buses in an Urban Contract Area	Buses in a Non-Urban Contract Area	Buses on Specified Roads
High population density	Lower population density	Long steep or very steep roads
Lower speed limits and average vehicle speed	Many roads with speeds >60kph–110kph	Standees are banned
Shorter journeys	Longer journeys	Three-for-two seating common
Predominantly sealed roads which are generally not steep/winding	Sealed and unsealed variable (to undulating/winding) roads	
Identifiable peak periods of slow dense traffic	Range of traffic volume and vehicle types	
Standees common	Fewer standees	
Three-for-two seating common	Three-for-two seating common	

Phased introduction of safety requirements on a priority (high-risk) environment basis

Highest Priority Environments

1. Environment 3—Specified Roads, which are roads of long or very steep descent under the Department of Main Roads *Manual of Uniform Traffic Control Devices* 1995

2. Environment 2 Freight Routes—High speed routes with high traffic volume and mix

3. Other Environment 2—Other high speed routes

Passenger injury in a bus crash is most severe in a rollover crash in a bus that does not have adequate protection, or a crash at high speed with another heavy vehicle (*Overview* p 25, *Practitioners* p 2). These crashes are more likely in Environment 3 where roads are steep or Environment 2 where speeds are higher. In Environment 2, freight routes are higher risk than non-freight routes as they carry more heavy vehicles (Smith, 1998).

Buses for students with disabilities, which operate under special contracts, already meet or exceed most of the standards recommended below. For the purposes of the recommendations, any bus on a Disability Service Contract which does not meet the recommended safety standards will have to be classified as Environment 1, 2 or 3 and included accordingly.

4.4 The school transport bus industry

The school bus operator/driver industry is crucial to the provision of transport to Queensland school students. A strong and viable school bus industry is essential for the safe school transport task. In some rural and remote areas of the State the school bus is the only means of transport to school. As an industry, school bus transport is vulnerable. With more than half its members single-bus operators, many do not have access to ready capital for new or replacement buses. For employee drivers and driver/operators who are working exclusively on school contract work, hours/day can be limited to as few as two, and for this group income is limited and permanent motivated staff are hard to find (*Practitioners* p 15).

The Task Force acknowledges the complexity and internal vulnerability of the school transport bus system. The implementation of the safety recommendations in this report will need to be managed gradually, systematically and in a framework of optimal communication. Having bus operators go out of business for financial or other reasons will not be of benefit to any stakeholder, particularly students.

Currently, bus operators are funded by the Queensland Government under the School Transport Assistance Scheme (STAS, *Overview* p 22). Many families rely on bus transport as the only means for their children to travel to and from school. To a certain extent, the provision of funding through STAS influences

how a child gets to and from school. The Task Force was able to explore with bus operators some ways in which the industry could be made more viable by:

- reviewing STAS to enhance commercial viability for bus operators and to ensure that the objectives of the scheme remain relevant in the light of the recommendations of the Task Force
- exploring the feasibility of staggering school starting and finishing times on a coordinated basis with a view to more efficient use of buses and more consistent work for drivers
- developing means of increasing charter work for school buses outside school transport hours.

Clearly none of these strategies will be effective unless bus operators provide the type of service which potential clients would seek out in terms of availability, safety and quality.

In order to assist the whole bus industry as well as the provision of services to schools, consideration might be given to the supported development of a stronger bus design and manufacturing industry in Queensland with an appropriate environmental safety emphasis. The fundamentals for a leading Australian bus industry are already in place in Queensland, with around 40 per cent of Australia's school buses supplied by the State (*Practitioners* p 13). The industry would need only moderate assistance to move to the next stage. Creation of a new, safe school bus at reasonable cost could be an ideal initial project for such an industry. This would not only create safe buses but also an expansion of the manufacturing industry across a broader base in Queensland and more jobs for Queenslanders.

4.4.1 Current practices

The Task Force is aware that standee practices have allowed the school bus fleet to be flexible enough to deal with day-to-day and month-to-month fluctuations in passenger numbers that are often caused by factors outside the bus operator's control. These factors are as broad as weather and as specific as parental availability on a particular day.

Any recommendation to abolish standee practices will have implications for everyone in the bus transport community. Without appropriate longer term planning, there could be a mismatch between numbers of seats available and numbers of students wishing to travel at any one time. Future bus design and the use of relatively new urban route buses which are specially designed to carry standees may have to be reconsidered. Individual bus operators' the bus industry and bus patrons will certainly be affected.

The simplest and most obvious solution is to increase the number of buses to accommodate seated passengers, but from an operator's point of view each bus has to generate sufficient income to make its operation a viable business proposition and this is difficult if the bus is not filled or only travels short distances. Sufficient additional buses cannot be found at short notice and cannot be maintained idle in case of sudden need and still sustain long term viability for the operator.

The Task Force explored options

- to fund all buses to operate at less than full capacity
- to allow a defined number of standees in safer Environments (eg buses in Environment 2 which travel into Environment 1 during their route could be permitted to allow standees when in Environment 1).

The issue of standees on buses with seat belts needs to be seriously considered. While the Task Force is of the view that standee practices will have to be abolished in buses fitted with seat belts, it acknowledges the need to allow for some short-term flexibility in implementation. This will be made possible by the gradual introduction of seat belts according to risk Environments.

Like standee practices, the strategy of allowing three-for-two seating has accommodated fluctuations in capacity for bus operators but clearly has significant implications for fitting seat belts. The bus industry has demonstrated innovative design ability over many years. The Task Force anticipates that seats suitable for small children which allow for three-for-two seating will continue to be available after the introduction of seat belts thus safely allowing for continuation of the current practice to expand bus capacity. Further work needs to be done, and the Task Force strongly supports development and testing of appropriate seating solutions. This will have national funding implications.

4.5 Conclusions

It is clear from the evidence presented in the *Overview of Research and Practice* that many safety features work together to achieve

optimal safety for bus passengers. Seat belts alone, particularly in the context of the aged Queensland school bus fleet, are unlikely to save lives in the absence of other important safety features such as rollover strength, seat and seat anchorage strength, and padding. The Task Force has considered all these issues relating to safer bus travel as composite parts of a whole.

The Task Force recognises that the introduction of seat belts and the consequent change in current loading capacity will cause a number of logistical problems and will come at a cost. Additional buses will be needed due to the reduced capacity of a seat-belted bus. Abolishing standee practices in the higher risk areas of Environments 3 and 2 will result not only in more vehicles, but in vehicles that cannot operate viably under current funding structures.

Current funding levels and fare schedules, set by the Queensland Government, are based on buses being able to carry standing passengers. The recommendations here will change this scenario. Before implementation, payment rates and fare schedules will need to be reviewed. This will require additional funding by Government for eligible students and higher fares from parents for fare-paying students.

The Task Force considered the timeframe in which the recommendations would be implemented. For seat belts, particularly in buses operating in Environment 3, an interim approach might be considered to fit seat belts in exposed seats in buses which already meet the Australian Design Rule for rollover strength.

The Task Force considered a number of issues to do with identification of school buses, including the importance of awareness among drivers that they are approaching a school bus. Initially, the Task Force considered that all school buses should be painted a uniform colour, but high-visibility strips developed and trialled by Queensland Transport present a cost-effective alternative (*Overview* p 27).

The Task Force considered the issue of responsibility for ensuring students wear seat belts on buses (*Overview* p 17). Within current legislative provisions, a passenger in any vehicle must wear a seat belt if one is provided. In cars, the driver is legally responsible for ensuring passengers under the age of 16 wear seat belts. In buses, drivers are not legally responsible for ensuring passengers under 16 wear seat belts if they are provided. The Task Force does not wish to recommend any changes to these provisions. More community education is needed to emphasise the importance of wearing seat belts in all vehicles in which they are fitted (see section 3.2). In addition, the Queensland *Code of conduct for school children travelling on buses* (Queensland Transport, 1999, see section 3.3) will need to be modified to incorporate student conduct around seat belts, to discourage misuse and encourage seat belt wearing.

The recommendations below are bus rather than school transport based, so although they refer to buses carrying students to and from school, they will have safety benefits for others who use the buses, and so a double standard will not be created by virtue of the Task Force's brief.

There are two categories of bus that are not included in the typology above: school-owned and operated buses and buses used by schools on excursions. The Task Force believes that these buses should also be reviewed to meet safety standards, although the funding arrangements for their upgrading will need to be different. The Task Force has made separate recommendations for these types of buses.

4.5.1 Costs

The targets below will require a substantial upgrade of the Queensland bus fleet, particularly to ensure that buses used in school transport meet rollover strength standards and are fitted with seat belts. The fleet upgrade will involve a substantial cost to the whole community, and Government will have to be a significant contributor to this cost. The inter-dependence among safety features cannot be over-emphasised. Rollover strength, seat and seat anchorage strength and seat belts work together to improve safety. The Task Force has proposed a cohesive package of safety features and piecemeal implementation will not deliver optimum safety benefits.

The costs provided here are broad estimates based on full replacement to upgrade the Queensland fleet. They do not take account of

- the current subsidies through which bus replacement is already funded
- the increases in operating costs which will result from targets to introduce seat belts and abolish standee practices.

With these caveats, the Task Force has been advised that

- bus replacement (based on full replacement costs only) to meet targets below for rollover strength, seat and seat anchorage strength and seat belts will cost between **$450 and $500 million** over a 15-year period
- the target for padding will cost **$1.5 million** over a two-year period
- the target for identification through lights, warning signs and high-visibility strips will cost **$1.5 million** over a two-year period.

The Task Force makes its recommendations after careful consideration of evidence. A serious bus crash, the rare but potentially grave event, must be considered in coming to conclusions about ways to improve bus safety and areas where risk is highest must have first priority. The targets specified below mitigate the potential consequences inherent in transport by bus, with priority accorded those buses traversing steep or high speed roads.

4.6 Recommendations

Achieving the targets set out here in the proposed timeframe will depend on both the funding available to upgrade the Queensland fleet and the manufacturing capacity to produce new and upgraded buses at an appropriate pace.

The Task Force recommends that the Queensland Government adopt a subsidised program to upgrade buses carrying students[9] to and from school and thereby increase safety, with the following targets:

(i) Achieving rollover strength

All buses[10] to comply with ADR 59/00 for rollover strength by 30 June 2017.

At least half to reach compliance by 30 June 2009, with buses that operate in Environment 3 accorded first priority, followed by buses that operate in Environment 2, starting with those operating on major freight routes.

(ii) Achieving seat and seat anchorage strength and fitting seat belts

A program commencing July 2002 for buses[11] meeting ADR 59/00 to be fitted with ADR 68/00-compliant seats (including seat and seat anchorage strength and seat belts) in the following priority order:

- Buses operating in Environment 3
- Buses operating in Environment 2, starting with those operating on major freight routes.

Note: A design solution will need to be found to accommodate smaller (<25kg) children in lap-sash style seat belts.

Five-yearly targets to be established to ensure that by 2017 at the latest, every bus operating in Environments 2 and 3 is fitted with lap-sash style seat belts.

No changes recommended in current legislative provisions under which bus drivers are not responsible for ensuring those under 16 years of age wear seat belts on buses.

(iii) Standees

A program introduced concurrently with the introduction of seat belts from July 2002, to abolish standee practices on buses meeting ADR 59/00 fitted with seat belts operating in Environment 2, starting with those operating on major freight routes.

Five-yearly targets to be established to ensure that by 2017 at the latest, standees are not permitted on any bus operating in Environment 2.

Note: Standees are currently not permitted on buses operating in Environment 3.

(iv) Padding every bus

By 30 June 2004, all buses carrying students to and from school to comply with the information bulletin, *Safety Padding for Bus Handrails, Seats and Partitions* (*Overview* p 25).

(v) Identification of every bus

By 30 June 2004, all buses carrying students to and from school to comply with the following:

- appropriate flashing lights and school bus warning signs (already specified)
- a ban on any advertising that interferes with recognition of the bus as a school

[9] Including Buses on Disability Service Contracts.
[10] Except for low-floor buses which are specifically exempt.
[11] This does not include mini-buses which are <3.5-tonnes and required to meet ADR 4/03 for seat belts and ADR 5/03 for seat belt anchorages.

bus (must not cover warning signs or flashing lights)

- high-visibility strips of an easily identifiable colour so that a bus is immediately recognisable anywhere in the State as a school bus.

(vi) Buses in Environment 1

The safety of buses operating in Environment 1 to be the subject of a review with regard to seat belts and standees once the above targets are reached.

4.6.1 Buses not automatically included

The Task Force recommends:

(i) that steps be taken by the Queensland Government to ensure that the targets for rollover strength, seat and seat anchorage strength, seat belts, standees, padding and identification included in these recommendations apply to all buses used in school transport, including buses funded by schools (and not funded by Government); and

(ii) that schools, and through them parents, be informed of bus design safety facts, eg the need for rollover strength and the relationship between rollover strength, seat and seat anchorage strength and seat belts, and encouraged when they hire buses (not otherwise covered under these recommendations) to use buses that have rollover strength and seat belts for excursions which travel on Environments 3 or 2 roads.

4.7 Bus drivers

4.7.1 Key findings

Interviews with bus operators and education practitioners pointed to the need for better training programs for drivers of buses carrying students (*Practitioners* p 15). Concerns about bus driver behaviour (generally in terms of leaving children behind, closing doors too early, overshooting stops etc, and specifically on certain routes) were raised in 20 submissions, with calls for better training in behaviour management (*Community* p 10).

Research suggests that bus drivers find behavioural problems among students difficult to manage (*Overview* p 16).

Queensland Transport's *Code of conduct for school children travelling on buses* (Queensland Transport, 1999) provides a framework for bus operators to manage student misbehaviour on buses. Queensland Transport is currently working with Education Queensland and the Queensland Bus Industry Council to develop a training package for bus drivers linked with the *Code of conduct* (*Overview* p 15).

Currently all bus drivers in Queensland have to be trained as part of Operator Accreditation and Driver Authorisation requirements under Queensland legislation. Under the legislation, the training should ensure that drivers are aware of their obligations to operate the bus safely and that they understand their customer service responsibilities and conduct themselves appropriately. Some innovative bus operators offer specific training in communication and negotiation when dealing with students (*Overview* p 16).

4.7.2 Conclusions

Bus drivers are a highly significant link in the overall chain of safe school transport by bus. At least partly because of the fragile nature of the school bus industry, drivers tend to be transient or part-time employees and as such do not necessarily have appropriate recognition and training as key people in safety on buses.

The bus industry is to be commended for its work to date to create a training package for bus drivers linked to the *Code of conduct* (Queensland Transport, 1999) already developed for schools and bus operators.

The Task Force recognises the key role played by drivers and the potential for expanding their role as safety promoters, but shares the industry view that training is required. Training will be more effective if the following conditions can be met

- some degree of assurance with regard to sufficient hours of work for individual needs and longer term employment arrangements
- respect for the role from students, parents, school operators and drivers themselves
- skills of communicating and negotiating with students are developed
- friendly, helpful service is a goal drivers themselves accept and promote
- drivers are involved in school and community bus safety learning programs.

The Task Force believes that accreditation based on passage through initial and subsequent training programs would greatly assist in achieving the elevation in status and performance required to make this work appealing and satisfying.

4.7.3 Recommendations

The Task Force recommends:

(i) that compulsory training of bus drivers using programs currently under development by Queensland Transport, Education Queensland and the Queensland Bus Industry Council (QBIC) be supported, with the following issues highlighted

- the focus of this training should revolve around *The Code of Conduct for school children travelling on buses (*Queensland Transport, 1999*)*
- training must be owned and accepted by bus drivers themselves
- initial training should be part of an induction program for all drivers but continuing training should also be developed
- training programs should be complementary to school-based programs for students and integrated where possible; and

(ii) that the employment conditions of bus drivers be reviewed progressively to allow for a system of driver accreditation and salary reviews linked to training which would sustain a permanent, credible workforce.

4.8 Emergency services planning

4.8.1 Key findings

National data show that injuries and fatalities in school transport-related bus crashes are more likely in rural or regional areas with speed limits greater than 80kph (*Overview* p 11).

The typology of buses by Environment used to prioritise a fleet upgrade in this report characterises buses by highest risk areas—buses on steep and higher speed routes to be upgraded first. These routes are more common in rural and remote areas which also tend to be further from major emergency services.

The need for an emergency plan for school bus routes was raised in 8 submissions (*Community* p 11) and in interviews with researchers and practitioners (*Practitioners* p 7).

4.8.2 Conclusions

Health professionals are currently working to develop Statewide trauma pathways in the Queensland Emergency Medical System (QEMS).

In a separate but related process, the bus industry is currently working with the Minister for Transport on the adoption of a Critical Incident Management Plan for the entire bus and coach industry. This plan would encompass all Queensland-accredited bus and coach operators and would also cater for interstate coaches. The plan is nationally based, but would be localised throughout Queensland in cooperation with local emergency services.

An emergency response and action plan for school bus routes should be part of the broader system for coaches and long-distance buses. It should also be capable of harnessing the resources of local emergency services throughout the State and needs to be located in the larger trauma system.

4.8.3 Recommendation

The Task Force recommends that the Queensland Government develop a coordinated system for the provision of emergency services, incorporating an emergency response and action plan for all school bus routes, with priority given to rural and isolated areas and high-speed routes (>80kph).

5 EVALUATION AND MONITORING

Arrangements need to be made to ensure ongoing monitoring and evaluation of Queensland road crash data related to school transport and the implementation of the recommendations included in this report.

5.1 Key findings

Data analysis was difficult, particularly in the Queensland context. While school transport-related fatalities and hospitalisations were made available for the purpose of this review, these data are not easily extractable, systematically produced or fed back into the various organisations within the school transport system to ensure safety is continually improved.

Even given the goodwill and resources of Commonwealth and State data agencies, the Task Force finished its work without key data including total populations using various modes of transport, and fatalities and hospitalisations by rural/urban area.

5.2 Conclusions

School transport involves many organisations and groups including government at all levels, schools and other education providers, police, emergency services providers and bus operators. The establishment of a Task Force brought together stakeholders and community members to look at the world from the school transport point of view. The Task Force does not support the establishment of a large new bureaucracy responsible for school transport, nor does it seek to create a homogeneous new organisation responsible for school transport. At the same time, there is a need for ongoing monitoring and evaluation of this vital area of safety.

The Task Force was unable to take a comprehensive risk management approach to its work as least partly because of inadequate data, particularly at State level.

5.3 Recommendations

The Task Force recommends:

(i) that an appropriate body, nominated by the Queensland Government, be made accountable to assure the Government that the recommendations of this report, as finally adopted, are implemented, with publicly available reports against the recommendations yearly from the date of approval;

(ii) that the implementation body referred to in recommendation (i) above include representation from key stakeholders including education providers and the bus industry; and

(iii) that appropriate Government agencies expand their data collection, extraction and accessibility to allow effective monitoring and evaluation of programs implemented as a result of this report and of trends more generally in school transport-related fatalities and hospitalisations.

6 CONCLUSION

The establishment of a School Transport Safety Task Force has provided an opportunity to examine Queensland data and review national and international research and contemporary practice on strategies to improve school transport safety. It has also highlighted for the Queensland Government the importance of community commitment to and involvement in developing solutions to school transport safety problems.

The Task Force received hundreds of written and verbal submissions during its six months' duration. There were almost a thousand visits to the School Transport Safety website. There was extensive media coverage of the Task Force's work.

This community interest augurs well for the safety of young Queenslanders travelling to and from school. Behind every one of the students, parents, teachers, bus operators, education providers, community groups, schools, transport planners, road safety bodies and interested individuals who contacted the Task Force, there is a community with an interest in and commitment to keeping young Queenslanders safe as they travel to and from school.

The 65 fatalities in school transport-related crashes in the decade to 2000 could have been prevented. The Task Force is confident that over the next decade

- community awareness will improve
- commitment throughout the community will be harnessed and strengthened
- tax-payer resources to implement recommendations will be forthcoming
- industry and the media will be proactive,

and Queenslanders will look back in ten years' time and know they have achieved the goal of safe school transport.

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Queensland School Transport Safety Task Force

Overview of Research and Practice

This preliminary document prepared by the Queensland School Transport Safety Task Force provides an overview of research and practice in school transport safety. It does not include recommendations.

The Task Force will present its final report with recommendations in September 2001.

J U L Y 2 0 0 1

CONTENTS

EXECUTIVE SUMMARY

The School Transport Safety Task Force was set up by the Queensland Government in March 2001 to investigate and report within six months on ways to improve school transport safety in Queensland. This preliminary *Overview of Research and Practice* identifies areas of risk in school transport in Queensland and presents the results of a review of current research, policy and practice in school transport safety throughout Australia and internationally. It does not include recommendations.

Before making recommendations, the Task Force will complete an analysis of submissions from community members and stakeholder organisations. The 185 submissions received to date cover a wide range of school transport safety issues, including concerns about bus transport and rural and remote road safety. The Task Force looks forward to interviewing a sample of respondents and to receiving further submissions in response to this overview.

The Task Force is also interviewing experts in road safety research, road engineering, education, media, policing, and health and emergency services, and stakeholders in transport planning, transport management and bus design. Community, stakeholder and expert contributions will inform the Task Force's final report and recommendations.

The safety of young Queenslanders travelling to and from school relies on a complex network of relationships that extends to almost everyone in the community, whether as students, parents and carers, educators, drivers, media and health professionals, transport planners, or bus operators and designers. Ultimately, improving school transport safety will involve the commitment and action of all these community members.

In Queensland, school transport-related student fatalities have decreased in line with national trends, from seven fatalities in 1991 to three in 2000. Numbers of injuries during the same period (113 hospitalisations in 1991, compared with 141 in 2000) have not decreased consistently with national trends. Further improvements in the safety of young Queenslanders on the way to and from school will need continued commitment and hard work.

Between 1991 and 2000, more than 90 per cent of the 1384 school transport-related fatalities and hospitalisations in Queensland occurred among students travelling in cars, on bicycles or as pedestrians. The Task Force is currently gathering information on strategies to improve the safety of students travelling by these modes.

Two thirds of the 383 school transport-related pedestrian fatalities or hospitalisations in Queensland in the past decade were younger students (under 12 years) who were much more at risk in the after-school travel period than in the before-school travel period. Younger students (especially under 10 years) can lack the perceptual skills needed to judge distance and speed of approaching vehicles. Training programs that provide models of apppropriate young pedestrian behaviour may provide more effective learning than information-only education programs.

A number of Queensland school communities are highly innovative in their strategies for getting younger students to and from school safely, including "walking buses" and "bike trains" where adults supervise children walking or cycling to school in groups. All schools participate in one or more of the programs within Queensland Transport's Safe School Travel (SafeST) Schools Package which include the Speed Awareness program, crossing supervision, and infrastructure funding to improve routes to school. The Task Force is exploring whether current programs can be improved.

Vehicle speed plays a key role in determining crash and injury severity. Most urban school zones have speed limits of 40 kilometres per hour (kph) during certain times of the day, reflecting school start and finish times. At 40kph, drivers around schools may still be driving too fast; 30kph causes fewer fatalities and may provide more leeway for young pedestrians. Scandinavian countries, which have fewer school transport-related casualties, limit speeds to 25kph around schools. The Task Force is continuing to explore this issue.

When catching buses, students were most at risk as pedestrians walking to board or after alighting a bus. New South Wales and South Australia have speed limits around stopped school buses, of 40kph and 25kph respectively.

Most of the students killed or hospitalised as a result of motorcycle or car crashes were older (13–17 years) students. The Task Force was alarmed at the number (147) of 17-year-olds killed or hospitalised in school transport-related car crashes in the past decade. The Task

Force hopes to raise community awareness of this serious casualty rate and is seeking strategies to improve the safety of older students travelling in cars and on motorcycles to and from schools.

Fewer student bus passengers were killed or hospitalised with injuries than students using other modes of transport. At the same time, many students use transport by bus, with state bus transport assistance provided to almost a fifth of Queensland's school students. Even one major bus crash could have grave consequences. Task Force members share the community desire to ensure that bus passengers are safe. For this reason, the Task Force has considered a number of issues to do with bus design and management.

Transport to and from school by bus is provided on dedicated school services (the traditional school bus) and public passenger services (like Brisbane Transport buses). More than half (57 per cent) of the 1010 bus operators involved in school transport services in Queensland are single-bus operators. More than half the buses used in school transport are more than 15 years old.

In most crashes, injuries are less severe in a bus than in other vehicles because buses are of greater mass than most of the vehicles they collide with. Severe injuries occur when a bus rolls over and passenger space is compromised. For this reason, since 1992, buses in Australia have been built to comply with an Australian Design Standard for rollover strength, which ensures passenger space is maintained if the bus rolls over. Seventy-five per cent of the 2449 buses used to transport students to and from school in Queensland were built before 1992 which means they do not necessarily meet the rollover strength standard.

Most injuries in bus crashes are minor head and facial injuries which can be caused by metal seat-backs and posts. Queensland has design standards for impact padding on and around seats which came into effect from 1997 with partial retrospectivity. At most 61 per cent of the buses used to transport students in Queensland have impact padding on seats. These buses may also have other padding.

No Australian state currently requires buses carrying school students to be fitted with seat belts. Research suggests that the risk of injury in a rollover crash in a bus that does not meet the rollover strength standard is increased for passengers in seat belts, but that the additional benefits afforded by seat belts outweigh this risk. The cost of fitting seat belts is higher in older buses. It may not be possible to fit seat belts in some older buses.

In other countries where seat belts are fitted in buses carrying students and seat belt-wearing is mandatory (some US school districts and certain seats in certain kinds of UK buses in certain conditions), bus drivers are responsible for ensuring they are worn. Under current Queensland Road Rules, bus drivers are not responsible for ensuring that passengers under 16 years wear seat belts, even if seat belts are fitted.

All bus drivers must have basic driver and customer service training under Queensland legislation. Student behaviour on buses is at times difficult to manage and can be a distraction for drivers. Queensland Transport is currently developing a training program for bus drivers, to assist with student behaviour management.

Most states of Australia allow three-for-two seating among primary school-aged students, and available research suggests three-for-two seated students are not at greater risk. All states of Australia also allow standees, passengers who stand because there are insufficient seats available. Some states put time or distance limits on standing, or speed limits on buses carrying standees. One Australian study suggests standees are as safe as seated passengers. However, the US National Highway Traffic Safety Administration recommends against standees, and some states in the US do not allow standing passengers. The Task Force is continuing to explore the risk to standees on school buses, particularly in higher speed areas. There would be economic costs associated with discontinuing three-for-two seating and standee practices.

The Task Force is working towards submission of its final report with recommendations in September 2001. As its next steps, the Task Force will:

- complete its analysis of stakeholder and community submissions and interview a sample of those who made submissions
- complete its program of interviews with experts in areas of school transport safety and bus design and management
- research strategies for improving school transport safety among high-risk groups including students who travel by car, bicycle, motorcycle or on foot

- investigate further the issues of most community concern including bus and bus route safety.

The Task Force looks forward to further contributions from the community and stakeholder organisations.

As the Task Force has systematically reviewed the literature and policies and practices around Australia, it has become increasingly aware of the multifaceted nature of school transport safety and the large number of different, even unrelated, factors which influence the safety of students as they travel to and from school. Addressing any one of these factors might have a positive effect on safety, but addressing many factors even to a limited extent could have enormous benefit. School transport involves us all. Working together, the Queensland community has the potential to change road-user behaviour and improve school transport safety. These possibilities for change will be addressed in the Report of the Task Force, due at the end of September 2001.

INTRODUCTION

Each week day in Queensland, more than 600 000 primary and secondary school students travel to and from school, using a variety of public and private transport. Everywhere there is recognition of the value placed on the life of a child or young adult. Hence, maximising safety in school transport is a major concern for the whole community, and an issue that involves most of us in the community.

Because of its importance as an issue, school transport safety has been the subject of extensive research in Australia and internationally. Governments at all levels regularly review their policies and practices in order to identify and reduce risks. Most recently, the Australian Road Research Board (ARRB) developed a set of school bus safety recommendations which were incorporated into the draft *National School Bus Safety Action Plan*. The Plan sets a national goal to reduce the total annual number of child fatalities associated with school bus travel to zero by the year 2005 (Austroads, 2001a).

Formation of a School Transport Safety Task Force

In March 2001, the Queensland Government established an independent Task Force on School Transport Safety with the following terms of reference, approved by Cabinet:

- review current research on school transport safety, including the outcomes of recent studies and the effectiveness of current school transport safety programs
- prepare an interim report analysing international, national and interstate policies and practices relating to school transport, including the use of seat belts on school buses
- consult with stakeholders and community groups and invite public submissions
- make recommendations to Government within six months on priorities for ensuring the safety of children travelling to and from school and implications for the Government and the community.

Membership of the Task Force is:

- Dr Cherrell Hirst AO MB BS, BEdSt *Qld*, DUniv *USC*, FAICD, Director, Wesley Breast Clinic and Chancellor, QUT (Chairperson)
- Mr Garry Cislowski BAppSc (Surv) *QUT*, Lic Surv, President, Queensland Council of Parents and Citizens Associations (QCPCA)
- Mr Graham Davis, Divisional Manager, Brisbane Transport
- Ms Lorraine Douglas-Smith, Executive Director, Queensland Bus Industry Council
- Mr Alan Druery BA, BEdSt, MEdAdmin, DUniv *QUT*, FQIEA, FACEA, FACE, Executive Director, Catholic Education Commission
- Mr Greg Duck, BSc, BEdSt, MEdSt, DipInfProc *Qld*, Manager (School Transport), Education Queensland
- Mr Tony Kursius BA *Qld*, MPubPol *UNE*, Executive Director (Land Transport and Safety), Queensland Transport
- Dr Cliff Pollard BD, MB BS *Qld*, FRACS, FRCS *Edin*, FACS, Queensland Trauma Committee, Royal Australasian College of Surgeons
- Professor Mary Sheehan BA (Psych) Hons, DipPsych *Syd*., PhD *Qld*, FACRS. Director, Centre for Accident Research and Road Safety – Queensland (CARRS-Q), Head of School of Psychology and Counselling, QUT
- Ms Renae Moore BA (Psych) *Qld*, Research Officer and Secretary to the Task Force
- Mr Colin Edmonston BA (Psych) Hons *CQU*, Research Officer.

The Task Force held its first meeting on 26 March 2001 and agreed to meet fortnightly, until submission of its final report to the Queensland Government at the end of September 2001.

Purpose of this Overview

This overview discharges the Task Force's responsibility under its first and second terms of reference. The overview:

- identifies risks in the Queensland context by presenting national and Queensland road crash data for the past decade in terms of fatalities and hospitalisations among school-aged students during school travel times

- presents the results of a review of national and international research on school transport
- identifies issues for further consideration in terms of the various community members involved in school transport (students, parents and carers, educators, drivers, media and health professionals, transport planners, and bus operators and designers).

The Task Force has researched a number of safety aspects associated with school transport by bus. The Queensland Cabinet's terms of reference for the Task Force expressly mentioned the issue of seat belts in buses used for carrying students. A preliminary analysis of submissions to the Task Force indicated that transport by bus is an issue of concern in the wider community. Since the Task Force commenced its work, media coverage of school transport safety has focused almost exclusively on the issue of seat belts in buses.

The analysis of Queensland road crash data provided in this overview shows that in the 10 years from 1991, fewer students were killed or hospitalised as a result of bus crashes than as a result of crashes involving any other mode of transport. At the same time, the Task Force is aware that a major crash involving a bus could have grave consequences for families and communities.

A risk-management approach to school-transport safety would attempt to place a value on the potential *severity* of a crash in terms of social and financial cost, as well as *exposure* to danger faced by students and the *probability* or likelihood of a crash occurring. Such an approach would measure risk as the frequency of crashes multiplied by crash severity.

Risk	=	Crash Frequency	x	Severity
(Cost)		(Probability x Exposure)		(Crash Cost in Lives)

This relationship between probability and potential severity is a key one in devising strategies to improve school transport safety. While the Task Force intends to consider ways of improving safety in those modes of transport that have in the past resulted in fatalities and injuries, it also needs to be mindful of the potential losses which would result from a rare but grave event, such as a major bus crash. The Task Force will work to identify strategies that increase school transport safety by reducing crash frequency and/or severity (Department of Main Roads, 2001).

The Task Force recognises that school transport safety relies on a complex network of relationships between people, vehicles and infrastructure that extends throughout the community. No amount of planning and strategising from a task force or any other body will bring about the kind of change that community awareness can generate. This includes most of us—as drivers slowing down around schools, as parents and other adults modelling good pedestrian behaviour for younger students, as older students driving to school for the first time, or even as journalists with responsibility to inform the community about risks, or transport planners responding to community concerns about rural bus routes.

Ultimately, reducing the number of students killed or injured on their way to or from school may rely on every person involved in school transport. It is hoped that this overview provides insight into the areas of risk associated with school transport, as well as preliminary ideas and strategies for improved safety.

Scope of this Overview

This overview makes no recommendations. It is intended to inform and encourage further community contribution to help identify issues and possible strategies to improve school transport safety in Queensland.

The overview does not deal with the Task Force's final two terms of reference which concern consultation with stakeholders and final recommendations. The Task Force will need to consider submissions fully and undertake further community and expert consultation before preparing its final recommendations to Government.

For the purposes of this overview, the Task Force has determined that all literature reviewed should be current. In most cases, Australian literature has been limited to that published after 1988 when development began on bus-specific Australian Design Rules (ADRs). The Task Force is aware that its research task is not yet complete.

Task Force Work Plan

The ongoing processes to gather and respond to community input and expert advice are detailed below.

Community Input

In accordance with its terms of reference, the Task Force wrote to all individuals and

organisations who had expressed concern to the Premier or the Minister for Transport and Minister for Main Roads regarding school transport safety over the previous 12 months to invite them to make a submission. The Task Force also invited submissions from major school transport safety stakeholders, including Queensland schools and school bus operators. A public call for submissions was made through advertisements in all Queensland major daily newspapers on Saturday 31 March and Wednesday 4 April 2001. The call for submissions was also broadcast on regional radio, and advertised in *Education Views* and the Queensland Council of Parents and Citizens Association (QCPCA) newsletter in April. Before submissions closed, print and broadcast media provided a forum for discussion and debate on a number of key issues which helped to ensure that the Task Force's role was widely publicised.

The Task Force set up a dedicated Web page on the Centre for Accident Research and Road Safety-Queensland (CARRS-Q) Website, providing information about the Task Force and facts about school transport safety in Queensland. The Website has enabled lodgement of email submissions.

The official closing date for the first round of public submissions was 31 May 2001. A record of all submissions received has been incorporated into a database maintained by the Task Force that identifies, for each submission:

- the name of the concerned party or community group
- the nature of the issue(s) (eg seatbelts on school buses, standing passengers, safe routes to schools)
- the locality of the problem(s) (ie rural, urban, and remote).

A thorough analysis of submissions will be completed to pinpoint major issues in the Queensland context. Once common concerns have been extracted from the database, a number of submissions will be explored further through personal interviews.

Expert and Stakeholder Input

The Task Force is meeting with a number of experts including researchers in various aspects of road safety, educators, emergency services professionals, media professionals, engineers and police, to discuss school transport safety and strategies for improvement.

The Task Force is also meeting with bus operators, bus designers/manufacturers and other representatives of the bus industry to ensure a comprehensive coverage of relevant issues.

Further Information

Further information about the Task Force and related issues will be posted on the CARRS-Q Website:

www.hlth.qut.edu.au/psyc/carrs/schooltransportsafety/index.asp

SCHOOL TRANSPORT SAFETY: RECENT DATA

In order to identify the magnitude and characteristics of school transport-related crashes[1], the Task Force analysed national data from the recent Austroads (2001b) study of school transport by bus[2], and Queensland data provided by Queensland Transport on school transport by bicycle, bus, car, motorcycle, or on foot.

Scope of Data

This analysis looks at total fatalities and hospitalisations resulting from crashes involving various modes of school transport in Australia and in Queensland. The Task Force has no information about the total number of students using particular modes of transport other than buses. This makes conclusions about the relative safety of various modes of transport difficult.

Available data show that transport to and from school by bus resulted in fewer fatalities and hospitalisations than travelling in a car, cycling or walking to or from school. However, school transport by bus includes travel outside the morning and afternoon commuting times examined here (excursions, camps etc). Data on school transport by bus other than in commuting times were unavailable for analysis. A report of major bus crashes involving school students, including those occurring outside school commuting hours, is included as Appendix 1.

It should also be noted that school transport by bus includes school services, which are solely for student transport to and from school, and public passenger services which include a mix of school students and other passengers. The data here include both kinds of services. See later for details of **Bus Operators** and **Bus Designers and Policy-Makers.**

Differences between state and national data sets include differences in years of data collection, hours defining school travel times[3] and categories of school traveller. This means that only broad comparisons are possible between national and state data.

National Data

National trends are derived from the recent Austroads (2001b) study on school transport by bus which extracted data from three national road crash databases collated by the Australian Transport Safety Bureau (ATSB). Definitions of these databases are included in Appendix 2.

The Austroads research is limited to pedestrian and bus transport to and from school. National data on fatalities and injuries incurred in other modes of school transport (ie car, bicycle, motorcycle) were unavailable for analysis.

Table 1 shows fatalities and hospitalisations resulting from school transport-related crashes in Australia 1990 to 1997.

Table 1: Number of 5–17-year-old pedestrians and bus passengers killed or hospitalised in road crashes during school travel times in Australia 1990–1997

Mode of transport	Fatalities	Hospitalisations
Pedestrian/bus pedestrian	113	2151
Bus passenger	6	78

Source: Monthly Fatality Database and Serious Injury Database 1990–1997

In the eight-year period 1990–1997, a total of 113 fatalities and 2151 hospitalisations resulted from students[5] being struck by a vehicle during school travel times. During the same period, six student bus passengers were killed and 78 were hospitalised as a result of crashes.

Figure 1 (page 8) shows that the number of student pedestrians killed or injured in school travel across Australia decreased from 27 fatalities and 360 hospitalisations in 1990 to four fatalities and 213 hospitalisations in 1997. A further breakdown of the data used to complete Figure 1 is included in Appendix 2.

[1] For the purpose of this analysis, road crashes were deemed to be school transport-related if the following conditions were met:
- a school-aged student (5–17 years) was killed or hospitalised; and
- the school-aged student (5–17 years) appeared to be going to or coming from school (travelling during school commuting times on week days within school terms).

[2] School transport by bus includes school services and public passenger services.

[3] School commuting times are defined in national data as travel between 8am–10am and 3pm–5pm and in the Queensland road crash database as travel between 7am–9am and 2pm–4pm.

[4] National data count bus pedestrians, who are walking to board or after alighting from a bus, as pedestrians, whereas Queensland data draw a distinction between bus and other pedestrians.

[5] Student means 5–17-year-old in text references.

Figure 1: Number of 5–17-year-old pedestrians killed or hospitalised in road crashes during school travel times in Australia 1990–1997

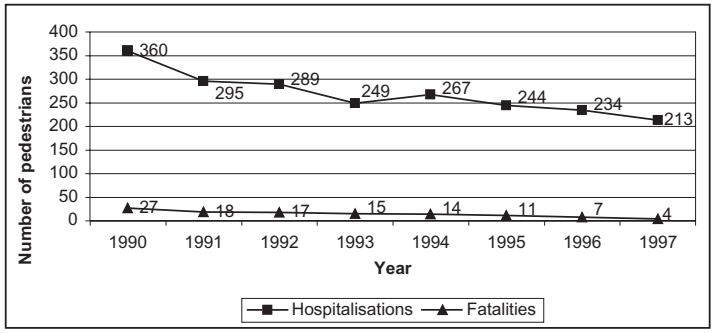


Table 2 presents school transport-related fatalities and injuries among pedestrians and bus passengers during morning and afternoon travel periods in Australia from 1990 to 1997.

More than three quarters of the pedestrian fatalities and hospitalisations occurred during the afternoon (3pm to 5pm) rather than the morning (8am to 10am) travel period. Bus passenger fatalities and hospitalisations show a similar trend.

The Austroads (2001b) study of bus crashes also drew on more detailed analyses of fatalities in 1992, 1994, 1996 and 1997 in school transport-related bus crashes. Key findings of these analyses are included under relevant headings of the **Queensland Data** section.

Queensland Data

This analysis provides an overview of fatalities and hospitalisations resulting from school transport-related crashes in Queensland for the period 1991 to 2000, by mode of transport, age and gender of students killed or hospitalised, time of day and region. The data were derived from the Queensland Police Service Traffic Incident Reporting System (TIRS) and are contained in the Queensland Road Crash Database maintained by Queensland Transport's Land Transport and Safety Division.

The Task Force acknowledges that the analysis presented here precedes a crash at Gracemere (near Rockhampton) on 7 March 2001 in which a bus on a public passenger service was hit from behind by a truck. In total, six passengers were hospitalised, of whom four were school-aged. There were no fatalities (see Appendix 1).

Mode of Transport

Ways of getting to and from school involve many different modes of public and private transport and reflect a complex network of relationships between people, vehicles and infrastructure. To make recommendations for improvements in school transport safety, the Task Force would ideally like to distinguish the degree of risk associated with different modes of transport. As indicated earlier, available data do not show the number of students using a particular mode of transport, except in the case of transport by bus. In other modes of transport, the only data available are the total number of fatalities and hospitalisations resulting from crashes. This makes comparisons difficult.

Table 3 (page 9) presents student fatalities and hospitalisations by mode of transport. The data show that 71 per cent of students killed during school travel times between 1991 and 2000 in Queensland were killed either in car crashes (45 per cent) or as pedestrians (26 per cent). Cyclists accounted for a further 14 per cent of fatalities.

Table 2: Number of 5–17-year-old pedestrians killed or hospitalised in road crashes morning or afternoon in Australia 1990–1997[6]

Mode of transport	Morning (8am-10am)		Afternoon (3pm-5pm)	
	Fatalities	Hospitalisations	Fatalities	Hospitalisations
Pedestrian/bus pedestrian	24	506	89	1645
Bus passenger	1	21	5	57
Total	**25**	**527**	**94**	**1702**

Source: Monthly Fatality Database and Serious Injury Database 1990–1997

[6] Because hospitalisation data are unavailable for 1998–2000, data on fatalities 1998–2000 were not included in Table 2. During 1998–2000, five pedestrian fatalities occurred in the morning period and 18 occurred in the afternoon period. See Appendix 2 for details.

Table 3: Number of 5–17-year-olds killed or hospitalised in road crashes during school travel times in Queensland 1991–2000

Mode of transport		Fatalities	Hospitalisations
Private car	(n=414)	29	385
Pedestrian	(n=383)	17	366
Cyclist	(n=484)	9	475
Bus pedestrian[7]	(n=72)	9	63
Bus passenger	(n=14)	1	13
Motorcyclist	(n=17)	0	17
TOTAL		**65**	**1319**

Source: Queensland Road Crash Information System 1991–2000

More than one third (36 per cent) of students hospitalised following school transport-related crashes between 1991 and 2000 were cyclists. A further 29 per cent of those hospitalised were in car crashes, and 28 per cent were struck by vehicles as pedestrians (not counting bus pedestrians).

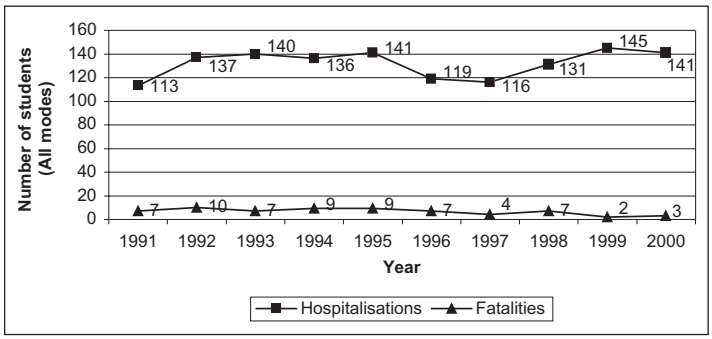
Unfortunately, the Task Force has no data on total populations using various modes of transport, except in the case of school transport by bus, where School Transport Assistance Scheme[8] (STAS) funding provides some guidance. Almost a fifth of Queensland's school-aged population (n=105 000) receive assistance for school transport by bus. It should be noted that receipt of STAS support does not accurately reflect school bus usage by Queensland students. On the one hand, a large number of students who do not meet STAS eligibility requirements pay cash fares and these are not included. On the other hand, STAS support does not necessarily guarantee that a student will take the bus to and from school every day. In 2001, STAS bus recipients make up 18 per cent of the student population in Queensland. Between 1991 and 2000, students travelling by bus accounted for only six per cent of the school transport-related fatalities and hospitalisations in Queensland.

Queensland data distinguish between bus passengers, who were on a bus when injured or killed, and bus pedestrians, who were walking to or from a bus when injured or killed. Of the 10 bus fatalities among students during school travel times in 1991–2000, nine were bus pedestrians. This is consistent with the more detailed analysis in the Austroads (2001b) study for 1992, 1994, 1996 and 1997 which found that fatalities were more likely to happen to bus pedestrians[9] than to bus passengers. (Austroads, 2001b).

Austroads (2001b) also found in the detailed analysis of 1992, 1994, 1996 and 1997 that nearly 90 per cent of school transport-related, bus-passenger and pedestrian fatalities were a result of crashes (or vehicles striking pedestrians) mid-block (away from intersections) on two-way undivided roads devoid of a pedestrian crossing.

Figure 2 shows that the number of students killed in school transport-related crashes in Queensland decreased from seven fatalities in 1991 to three fatalities in 2000. The number of students hospitalised as a result of crashes fluctuated throughout the period. Data tables are included in Appendix 3.

Figure 2: Number of students (travelling by all modes) killed or hospitalised in crashes during school travel times in Queensland 1991–2000



[7] A bus pedestrian is a pedestrian walking to board or after alighting from a bus.

[8] STAS is an eligibility-based scheme that funds student transport, mainly by bus (primary students must live > 3.2 km from the closest state primary school, and secondary students must live > 4.8 km from the closest state facility).

[9] A bus pedestrian is a pedestrian walking to board or after alighting from a bus.

Figure 3: Number of 5–17-year-old pedestrians killed or hospitalised in road crashes during school commuting times in Queensland 1991-2000

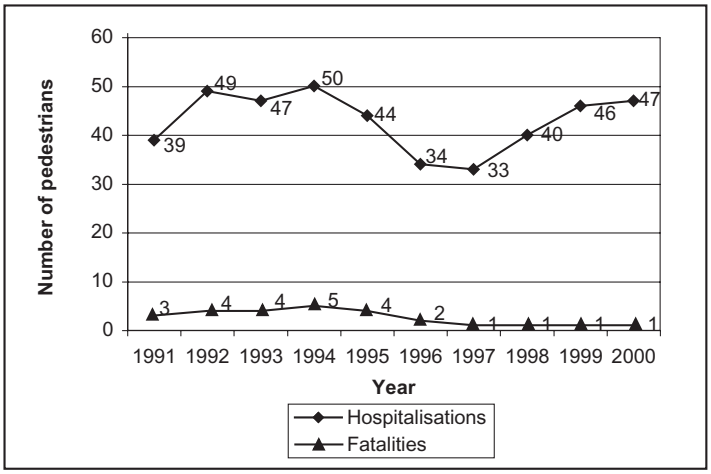


Figure 3 shows pedestrian (including bus pedestrian) and bus passenger fatalities and hospitalisations 1991–2000 in Queensland, in order to provide a point of comparison with Figure 1 national data.

While the number of fatalities has remained low, mirroring the national trend, the number of student pedestrians hospitalised after being struck while travelling to or from school in Queensland increased from 39 hospitalisations in 1991 to 47 hospitalisations in 2000. Although fluctuation in hospitalisation figures can be expected given the small numbers involved, the Queensland experience is not consistent with the decreasing national trend in student pedestrian hospitalisations during school travel (Austroads, 2001a).

There were 14 school transport-related bus pedestrian hospitalisations in Queensland in 2000, compared to six in 1999.

Age

The age range of students involved in school transport spans developmental stages of childhood and adolescence and the shift from primary to secondary education. The Task Force explored patterns that might emerge based on age of school travellers.

Table 4 provides a breakdown by age of student fatalities and hospitalisations.

Across all modes of transport, primary school students (5–12-year-olds) accounted for just over half (50.1 per cent) of fatalities and hospitalisations. However, while cyclist and bus passenger fatalities and hospitalisations are fairly evenly spread between primary and secondary (13–17-year-old) school students, two thirds of all pedestrian (including bus pedestrian) fatalities and hospitalisations were among primary school students. This is consistent with the national data (Austroads, 2001b) which showed that primary school students accounted for more than 75 per cent of school transport-related pedestrian fatalities.

More than 90 per cent of motorcycle and 60 per cent of car crash fatalities or hospitalisations were secondary school students. The number of motorcycle and car crash fatalities or hospitalisations rose sharply for 17-year-olds, presumably reflecting the age at which Queenslanders are eligible for a driver's licence. While the number of motorcycle crash fatalities or hospitalisations is much smaller than the number of car crash fatalities or hospitalisations, this is an issue of concern considering how few students would be likely to ride or be passengers on motorcycles.

Seventy per cent (147) of the 17-year-olds killed or hospitalised following road crashes were travelling in cars.

Table 4: Number and age of students killed or hospitalised due to road crashes during school travel times in Queensland 1991–2000

Mode of transport	Age												
	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs
Private car (n=414)	32	14	19	14	18	25	23	21	15	16	27	43	147
Pedestrian (n=383)	30	39	29	41	37	37	22	20	42	26	24	19	17
Cyclist (n=484)	1	14	14	26	30	38	40	55	74	61	47	49	35
Bus pedestrian (n=72)	2	10	4	7	2	6	6	10	10	7	2	5	1
Bus passenger (n=14)	0	0	2	0	2	0	1	2	2	1	2	2	0
Motorcyclist (n=17)	0	0	0	0	0	0	1	0	1	0	1	3	11
TOTAL	**65**	**77**	**68**	**88**	**89**	**106**	**93**	**108**	**144**	**111**	**103**	**121**	**211**

Source: Queensland Road Crash Information System 1991–2000

Gender

Table 5 provides a breakdown by gender of student fatalities and hospitalisations.

Table 5: Number and gender of 5–17-year-olds killed or hospitalised due to road crashes during school travel times in Queensland 1991–2000

Mode of transport	Gender	
	Males	Females
Private car (n=414)	191	223
Pedestrian (n=383)	239	144
Cyclist (n=484)	365	119
Bus pedestrian (n=72)	41	31
Bus passenger (n=14)	5	9
Motorcyclist (n=17)	14	3
TOTAL	**855**	**529**

Source: Queensland Road Crash Information System 1991–2000

Overall, more male students (1.6 to 1) were killed or hospitalised as a result of road crashes in school travel times than females. There were also many more male cyclists (3.1 to 1) and more male pedestrians (1.7 to 1) killed or hospitalised. More females were killed or hospitalised as a result of car or bus crashes.

Time of Day

National data (Austroads, 2001b) suggest students are at greater risk of school transport-related crash injuries in the afternoon than in the morning travel period. Table 6 presents the Queensland data on student fatalities and hospitalisations by time of day.

Table 6: Number of 5–17-year-olds killed or hospitalised by time of day of road crashes during school travel times in Queensland 1991–2000

Mode of transport	Time of Day	
	Morning (7am–9am)	Afternoon (2pm–4pm)
Private car (n=414)	154	260
Pedestrian (n=383)	87	296
Cyclist (n=484)	153	331
Bus pedestrian (n=72)	13	59
Bus passenger (n=14)	3	11
Motorcyclist (n=17)	4	13
TOTAL	**414**	**970**

Source: Queensland Road Crash Information System 1991–2000

Table 6 shows that students are much more likely to be killed or hospitalised following crashes in the afternoon, with 70 per cent of fatalities or hospitalisations occurring in the 2pm–4pm travel period.

More than three quarters (78 per cent) of pedestrian, bus passenger and bus pedestrian fatalities and hospitalisations occurred in the afternoon travel period, which is consistent with national trends (Austroads, 2001b).

Region

The detailed analysis of 1992, 1994, 1996 and 1997 included in the Austroads (2001b) study found that fatalities resulting from school transport-related bus crashes (bus passengers in crashes and bus pedestrians struck by a vehicle) occurred slightly more frequently in rural or regional areas with speed limits of greater than 80kph. A preliminary analysis of submissions to the Task Force identified rural and remote bus transport issues as a community concern.

Queensland school transport-related crash data are not available by urban/rural area in which crashes occurred. However, using raw data from the Queensland Road Crash Database, the Task Force was able to identify school transport-related fatalities and hospitalisations by speed zone.

Table 7 (page 12) shows the number of students killed or hospitalised in school travel times in speed zones in Queensland from 1991 to 2000. Unlike the data presented in previous sections, the data presented in Table 7 are raw and contain some cases that are not school transport-related.

Total populations in areas with posted speed limits of under-80kph are likely to be higher than in the over-80kph areas. Table 7 shows that overall, 59 per cent of fatalities and 87 per cent of hospitalisations occurred in under-80kph areas. Cyclists and pedestrians accounted for 75 per cent of hospitalisations in these areas.

The higher rate of hospitalisations in areas with lower speed limits might be a result of increased exposure (ie more students and more trips) in under-80kph areas.

In contrast, fatalities and hospitalisations among bus passengers were more likely (61 per cent) to occur in areas with a posted speed limit of 80kph or above. While the overall number is small, this difference is of concern considering that population differences would suggest the balance would be the other way.

Table 7: Number of 5–17-year-olds killed or hospitalised by speed zone of crashes during school travel times in Queensland 1991–2000

Mode of transport	Speed Limit ≥ 80kph More Rural		Speed Limit < 80kph More Urban	
	Fatalities	Hosp.	Fatalities	Hosp.
Private car (n=439)	19	129	21	270
Pedestrian (n=484)	8	18	20	438
Cyclist (n=504)	3	14	5	482
Bus pedestrian	Not distinguished from pedestrians			
Bus Passenger (n=18)	1	10	0	7
Motorcyclist (n=41)	1	5	0	35
TOTAL	**32**	**176**	**46**	**1232**

Source: Queensland Road Crash Information System 1991–2000 (Raw dataset)

This is also consistent with national trends (Austroads, 2001b).

The only other primary data source available to the Task Force at the present time is crashes by Queensland Transport operational region. The South East region is primarily urban, although differences between this and other regions may not necessarily highlight issues relevant particularly to rural and remote communities.

Table 8 provides a breakdown by region of crashes during school travel times 1991–2000.

Sixty-one per cent of the students killed or injured during school travel times were involved in a crash in Queensland Transport's primarily urban South East Region which accounts for 66 per cent of the total state population in 2001. This may point to a slightly greater risk in the less population-dense regions of the state, which would be consistent with Table 7 on crashes in over-80kph zones, and national data.

Table 8: Number of 5–17-year-olds killed or hospitalised by region of road crashes during school travel times in Queensland 1991–2000

Mode of transport	Region			
	South East	Southern	Central	Northern
Private car (n=414)	232	81	48	53
Pedestrian (n=383)	290	42	18	33
Cyclist (n=484)	265	86	73	60
Bus pedestrian (n=72)	45	9	4	14
Bus passenger (n=14)	9	3	1	1
Motorcyclist (n=17)	9	2	4	2
TOTAL	**850**	**223**	**148**	**163**

Summary of Recent Data

The analysis of school transport-related crashes in Queensland between 1991 and 2000 revealed that:

- While fatalities have decreased (from seven in 1991 to three in 2000), hospitalisations have fluctuated (between 113 in 1991 and 145 in 1999). Nationally, pedestrian and bus crash fatalities and hospitalisations have both decreased.
- More than 90 per cent of the students killed or hospitalised with injuries were travelling in cars, on bicycles or as pedestrians.
- Six per cent of the students killed or hospitalised with injuries were travelling by bus.
- One per cent of the students killed or hospitalised with injuries were bus passengers (the rest were bus pedestrians, walking to or from a bus).
- Currently, 18 per cent of Queensland's school students receive bus transport assistance.
- Primary school-aged students accounted for two thirds of all pedestrian fatalities and hospitalisations.
- Secondary school-aged students accounted for more than 90 per cent of motorcycle and 60 per cent of car crash fatalities and hospitalisations.
- More male than female students were killed or injured as pedestrians, cyclists or in motorcycle crashes.
- More female than male students were killed or injured in car and bus crashes.
- School transport-related fatalities and hospitalisations were more frequent in the afternoon. This is consistent with national research.
- More pedestrians, cyclists and students in cars were killed or injured in crashes in areas with speed limits of under 80 kilometres per hour. More bus passengers were killed or injured in areas with speed limits of 80 kilometres per hour or above. This is consistent with national research which also suggests pedestrian fatalities are more likely to occur in areas devoid of pedestrian crossings.

SCHOOL TRANSPORT SAFETY: THE PEOPLE

The data analysis in the previous section shows that the number of fatalities resulting from school transport-related crashes has decreased in Queensland in the past decade, consistent with national trends. This reduction in the state's road toll reflects changes in policy and the dedicated efforts of many sectors of the community.

National trends also show a decrease in hospitalisations. This trend is less apparent in Queensland where numbers of hospitalisations have fluctuated over the 10-year period. Further improvement in school transport safety in Queensland will require the continued commitment of everyone involved in school transport.

As a result of reviewing the data and gaining an increased understanding of the issues relating to school transport safety, the Task Force is forming a view that fundamentally it is people who influence school transport safety and people who are primarily able to bring about change as they understand better the issues. The Task Force has decided therefore to present this overview in terms of the roles, responsibilities and actions of the people concerned with safety at the various places along the school transport route, including the students themselves, their parents and carers, school educators, drivers around schools, transport planners, bus designers and operators, and health and media professionals.

Students

The Queensland school transport crash data show that in school transport-related crashes over the past decade:

- most students were killed in private cars or as pedestrians
- most students hospitalised were cyclists, pedestrians or in private cars.

Further investigation of the issues associated with school transport by car, bicycle and on foot will be undertaken in the coming months, ahead of the Task Force's final report.

The Queensland crash data also show that:

- primary school-aged students accounted for two thirds of all pedestrian fatalities and hospitalisations
- secondary school-aged students accounted for more than 90 per cent of motorcycle and 60 per cent of car crash fatalities and hospitalisations.

The data show that many more school students were killed or injured in the afternoon than in the morning.

Younger Students (5–12-year-olds)

Based on national and Queensland data, the most common scenario for a pedestrian school transport-related injury or fatality is when a primary school student (more typically male) is crossing a road when travelling home from school and is hit by a passing vehicle.

Safe road-crossing decisions require accurate judgement of speed and distance. Research suggests that primary school children lack the perceptual skills needed to learn safe road user practices and act appropriately in traffic. The general consensus among researchers is that the perceptual and cognitive functioning necessary to make such decisions may exceed young children's developmental capacity (Shinar, 1978; Siegler & Richards, 1979; Vinje, 1981). Based on the results of a series of experiments that measured school-aged children's road-crossing behaviour and ability to make judgements about gaps in traffic, Connelly et al (1998, p. 450) concluded that "…pre-adolescent school-aged children, particularly those aged below 10 years, have relatively poor skills at reliably setting safe distance gap thresholds, and thus do not consistently make safe crossing decisions."

The fact that younger primary students cannot be relied upon to make safe decisions in the traffic environment has direct implications for the management of school transport and pedestrian safety.

Older Students (13–17-year-olds)

Based on the Queensland data, older students are more likely to be killed or hospitalised as a result of car and motorcycle crashes than younger students.

The Task Force was concerned by the sheer number (147) of 17-year-olds killed or hospitalised following car crashes in the period 1991–2000. Motorcycle fatalities and hospitalisations, although much smaller in number, are also of concern.

The fact that fatalities and hospitalisations rose so sharply for 17-year-olds presumably reflects the fact that 17 is the age at which

Queenslanders are eligible for a driver's licence (see later under **Drivers of Cars**). The Task Force believes that increased community awareness of this risk to young adults may help. The issue of secondary school-aged travellers in cars and on motorcycles will be investigated further in the coming months. (eg increased community awareness, driver/rider education and supervision).

Student Behaviour on Buses

The behaviour of students in buses and associated driver distraction issues have been recognised as potentially contributing to crash risk (Henderson et al, 1995). The ARRB report noted that most Australian states have introduced codes of conduct to assist in the management of student behaviour on buses (Austroads, 2001a).

The Queensland Transport *Code of Conduct for Travel on Buses*, introduced in 1998, provides a framework to assist bus operators in the management of situations where students misbehave on buses. The Code outlines the role of students, parents/carers, conveyance committees, bus operators, school principals and Queensland Transport. The Code also identifies categories of misbehaviour (Queensland Transport, 1999).

Henderson et al (1995) conducted interviews with representatives from seven bus companies and schools in New South Wales, and found that instances of disruptive behaviour were few considering the large number of students travelling on buses. At the same time, they were frequent and alarming enough to be of concern to bus operators and schools. Bus companies said that some disruptive behaviour was distracting enough to prevent bus drivers from attending fully to the driving task.

Henderson et al (1995) attributed the disruptive behaviour of students to natural childhood exuberance, compounded by crowded buses and the mix of children from different age groups and different schools.

In Australia, there has been no systematic study of seat-belt wearing in buses among students or adults. In the USA, a study of 814 school districts with seat-belted school buses in New York and New Jersey (Centre for Urban Transport Research, 1994) revealed that in more than three quarters of the districts, students used their seat belts less than ten per cent of the time. The research also suggests students misuse their seat belts.

Parents and Carers

The analysis of Queensland data on school transport fatalities and injuries for 1991 to 2000 points to the afternoon school travel period as more likely to result in fatality or injury among students, particularly among 5–12-year-old pedestrians.

As discussed earlier under **Students**, research suggests children under 10 may not have developed the skills needed to judge distance and speed of approaching vehicles. This may have implications for the degree of supervision child pedestrians need.

Road safety education programs are the most common approach to preventing child pedestrian injuries in the school environment (Malek et al, 1990; Roberts, 1994). Austroads (2001a) noted that road safety education programs in each state target the behaviour of children around buses. Similar programs in the USA, Canada and the UK aim to increase the safe road user behaviour of children. Children are told about how to cross the road safely, danger zones surrounding a bus, appropriate conduct while on the bus, and school bus evacuation and emergency procedures.

Although road safety education programs have improved knowledge as measured by verbal report and/or observed behaviour, "… very few programs have produced evidence that the training is either durable or that it has reduced child pedestrian casualty rates." (Connelly et al, 1998, p.443). In fact, there is increasing concern that such programs give parents and children a false sense of confidence in the young child pedestrian's competence and safety (Connelly et al, 1998; Shinar, 1978; Vinje, 1981). Furthermore, "… specific cognitive developmental limitations may impose constraints on what children can learn and do in traffic environments, which also increases their crash risk." (Connelly et al, 1998, p.443).

Parents and carers play a pivotal role in pedestrian behaviour among younger students. Training as opposed to information-only education (showing rather than telling) has a greater potential to positively shape child pedestrian behaviour. A child's ability to make safe road-crossing decisions can be significantly improved by parents emphasising the dangers of the road environment and modelling safe road crossing behaviour, for example, by 'commentary walking' where parents talk through or explain while modelling safe pedestrian habits (Lam, 2000; Van Schagen & Rothengatter, 1997).

Drivers of Vehicles Carrying School Students

Drivers of Cars

National and Queensland data on school transport-related crashes reveal that more students are killed in car crashes on the way to and from school than in any other mode of transport. Older students are more at risk than younger students, and females are more at risk than males.

The Task Force sees school transport by car as an area for further work. There may be few strategies specific to drivers of cars carrying students, but a first step of identifying the risk, particularly among older students, and increasing community awareness, may help.

Cyclists

Queensland road crash data reveal that more cyclists were hospitalised than students using any other mode of transport. There were more male cyclist fatalities and hospitalisations than female.

Cyclists have some characteristics in common with pedestrians in school transport, including the need for skills in judging speed and distance of oncoming vehicles. The research on development of perceptual skills in younger pedestrians (see earlier section on **Students**) is equally relevant for younger cyclists.

Cyclists also share with pedestrians the need for safe routes to school which are appropriately separated from faster vehicles. See later section on **Transport Planners**.

The Task Force noted that helmets have been mandated for cyclists since 1991 in Queensland. Since this time there has been a marked decrease in head injuries (King & Fraine, 1994). The Task Force has asked Queensland Transport to provide data on helmet-wearing rates among students and the complex problem of enforcing helmet-wearing.

The Task Force will explore factors contributing to cyclist injuries in the coming months, to identify strategies to improve their safety.

Drivers of Buses

The recent Austroads (2001b) analysis for 1992, 1994, 1996 and 1997 indicated that there were slightly more bus crash fatalities in rural or regional areas with speed limits greater than 80kph. Queensland data also point to more fatalities and hospitalisations in over-80kph areas as a result of bus crashes.

Under the *Transport Operations (Road Use Management – Vehicle Standards and Safety) Regulation 1999*, all Queensland buses with a Gross Vehicle Mass (GVM) of more than 14.5 tonnes are mechanically or electronically speed-limited to 100kph. This represents 13 per cent of the buses used in school transport (Queensland Transport, 2001).

In early 2001, Queensland Transport conducted a trial of a lowered speed limit for school buses carrying standees (passengers forced to stand because there are no seats) in the Jimboomba area (Cluff & Dwyer, 2001) in which the buses were not permitted to travel above 80kph. The distance that standees were permitted to travel was decreased from the current limit of 20 kilometres to 16 kilometres, to ensure that exposure to crash risk was not increased because of increased travel time. An evaluation of the trial indicated that reduction in speed did not negatively affect driver schedules, and the report concluded that there were no concerns with restricting the speed of buses to 80kph when carrying standees (Cluff & Dwyer, 2001).

In NSW, there is a policy of restricting the speed of school buses carrying standees to 80kph.

Bus Driver-Passenger Interaction

Henderson et al (1995) found that school bus drivers lacked knowledge and effective behaviour management strategies and techniques that would help them respond to behavioural problems among students.

In Queensland all bus drivers are required to undertake training as part of the Operator Accreditation and Driver Authorisation requirements of the *Transport Operations (Passenger Transport) Standard 2000*. This training should ensure that drivers are aware of their obligations to safely operate the bus and that they understand their customer service responsibilities and conduct themselves appropriately. Some bus operators offer specific training in communication, complaints-handling and conflict management when dealing with students.

Queensland Transport has advised the Task Force that it is in the process of developing a training package for bus drivers in the management of student behaviour on school services, to work in conjunction with the *Code of Conduct* discussed earlier under **Students**.

In the USA the National Highway Traffic Safety Administration (NHTSA) has developed a proactive training package for

school bus drivers which addresses driver attitude, student management, loading and unloading issues, and the transportation of infants and toddlers (NHTSA, 1998). The package includes techniques for reducing driver stress.

Responsibility for Passenger Seat-belt Wearing

Under Queensland's *Transport Operations (Road Use Management – Road Rules) Regulation 1999*, a passenger of any vehicle must wear a seat belt if one is provided. In cars, the driver is legally responsible for ensuring passengers under the age of 16 wear seat belts. In buses, within current legislative provisions, the driver is not legally responsible for ensuring that those under 16 wear seat belts, even if seat belts are provided.

In the USA, a University of South Florida questionnaire study of school districts with seat-belted buses in New York and New Jersey (Centre for Urban Transport Research, 1994) pointed out that in the school districts where seat-belt wearing was mandatory (49 of the 814 school districts surveyed), it was school bus drivers who were responsible for ensuring belts were worn.

In the United Kingdom, where seat belts are mandated in minibuses in certain conditions and in coaches[10], drivers of minibuses are responsible for ensuring that seat belts are worn by children, and drivers of coaches are required to ensure that children in the seats in line with or forward of the driver wear a seat belt (Department of the Environment, Transport and the Regions, 1996). In the rear seats (ie those not in line with or in front of the driver) of coaches and larger minibuses (over 2540 kg) there is no statutory requirement for children to wear seat belts or child restraints.

Drivers of Other Vehicles

Speed Around Schools

All Australian states and territories currently have mandatory school zone speed limits. In Queensland, speed limits of 40kph, 60kph, or 80kph, depending on the usual speed limit of the area, apply around schools for specified school travel time periods.

The 40kph speed limit typically adopted in school zones has been shown to be associated with shorter stopping distances and a reduced likelihood of collision (Witherby, 1996). Enforcement of 40kph speed limits is a responsibility of the Queensland Police.

In Queensland, the SafeST Package (discussed later under **Principals, Teachers and School Communities**), offered by Queensland Transport and coordinated by individual schools, includes a Speed Awareness Program in which a school community can operate radar devices with vehicle speed display boards. The Queensland Police provide assistance about where to place devices if requested. The program has the potential to raise motorist awareness and reduce vehicle speeds in school areas. There is also a need for enforcement and police activity in school zones to change driver behaviour. To date, the Task Force has been unable to access data on how often school zone speed limits are enforced.

Speed zones around schools apply on week days during school terms, with times of day varying for individual schools. Drivers need to be aware not only of the driving task and the special risks around schools but also of the time of day, day of week and week of term in order to monitor their speed.

Pedestrian safety depends on vehicle speed, and there is continuing debate as to whether 40kph is a low enough speed limit around schools. A growing body of evidence suggests speeds need to be below 30kph to avoid most serious crashes (Oei, quoted in RTA, 1989; Várhelyi, 1998). At a collision speed of 50kph, the risk of fatal injury for a pedestrian is almost eight times higher than at a speed of 30kph (Pasanen, 1992). Based on a review of UK research, Hodge (1992) concluded that about 90 per cent of pedestrians struck by vehicles travelling at 40mph (64 kph) are killed; about 45 per cent of pedestrians struck by vehicles travelling at 30mph (48kph) are killed, but less than five per cent of pedestrians struck by vehicles travelling at 20mph (32kph) are killed.

In Scandinavian countries (OECD, 1983, cited in Pitt et al, 1990; Roberts, 1994), which are characterised by lower school transport-related child fatality and injury rates, the speed limit adopted around schools is 25kph.

The Task Force is continuing to consider advice from experts on the effectiveness of various reduced speed limits around schools.

[10] In the UK, a coach is a bus that can carry >16 passengers, with a GVM over 7.5 tonnes and a maximum speed of over 60 miles per hour.

Speed Around School Buses at Bus Stops

The national (Austroads, 2001b) data suggest that students who travel by bus are more at risk as bus pedestrians (walking to or from a bus) than as bus passengers. The analysis of Queensland data also pointed to a higher risk of fatality and injury among bus pedestrians than among bus passengers.

New South Wales and South Australia currently enforce speed limits around school buses at bus stops, of 40kph and 25kph respectively.

The New South Wales provisions were introduced in 1999 as part of a range of initiatives for school bus transport safety. All school buses are fitted with a 40kph speed limit sign and flashing wig-wag lights to the rear of the bus. Motorists travelling in the same direction as a school bus must slow down to 40kph if the bus has its wig-wag lights on and is preparing to stop (Austroads, 2001a). The Roads and Traffic Authority in NSW has commissioned an initial evaluation of a range of school bus transport safety initiatives introduced in conjunction with the speed limit around stopped school buses, but results of the evaluation are not yet available.

The South Australian Government introduced its 25kph "reduced speed limit around school buses" in 1997 (Gelston, 2000). Vehicles must slow to 25kph when a child is present in the road environment near a school bus. Although the South Australian initiative has not been subjected to evaluation, preliminary reports suggest the reduced limit is being adhered to by drivers (Gelston, 2000).

In New Zealand, motorists must not exceed 20kph when passing a stopped bus that is marked with "school bus" warning signs (Austroads, 2001a).

In the USA and Canada, motorists going in either direction must respond to a series of flashing lights on a school bus and stop when the bus stops to pick up or set down children, to allow children to cross the road if necessary (Centre for Urban Transportation Research, 1996). The laws are complex, with different requirements for motorists travelling on multi-lane divided roads. A University of Florida study of motorist compliance with school bus-stopping laws revealed that approximately one third failed to stop for Florida school buses when required (Centre for Urban Transport Research, 1996). Results of focus groups with Florida motorists suggested that the high incidence of illegal passing of stopped school buses was primarily the result of low enforcement levels and a lack of motorist awareness of the stopping requirements. The majority of the passing violations occurred when vehicles were travelling in the opposite direction to the school bus. Another survey of Florida's school bus stop laws revealed confusion among motorists about responsibilities as defined in the law, and the meaning of the various signals used by school buses (Baltes, 1998).

Mix of Vehicles

The mix of vehicles in a stream of traffic may affect the school transport environment and the safety of students around school buses.

Queensland Transport's Safe School Bus Routes program (discussed later under **Transport Planners**) considers vehicle mix when making decisions about priorities for bus routes nominated for review, and in the prioritisation of works (Queensland Transport, 1998).

The Task Force noted that only five per cent of the 2000 bus routes in Queensland have been reviewed under the Safe School Bus Routes program since its inception in 1997. The Department currently reviews 15 bus routes a year. School bus routes, particularly in rural areas, were a common concern raised in submissions to the Task Force.

School Principals, Teachers and School Communities

Queensland schools play a key role in school transport safety and the Task Force has identified a number of innovative programs implemented locally to improve safety for students.

The earlier section on **Students** points out that in Queensland in the last decade, school transport-related hospitalisations were highest among cyclists, and fatalities were highest in cars. Primary school-aged students were more likely to be killed or injured as pedestrians, and secondary school-aged students were more likely to be killed in car or motorcycle crashes.

To complement reduced speed limits in the vicinity of schools, road safety authorities in Western Australia, Victoria, South Australia, New South Wales and Queensland have worked with schools to implement Safe Routes to School (SRTS) style programs (Rose, 2000), based on a concept developed in Denmark in the 1980s (Neilson, 1990). These community-

based programs, which aim to improve the safety of student transport through increased adult supervision and the identification of safe travel routes to and from school, have become a core road safety initiative both in Australia (Rose, 2000) and the United Kingdom (Clarke, 1997).

SRTS programs aim to increase the number and safety of children walking and cycling to school through four common stages listed below (Rose, 2000):

- Planning and establishing the program—schools are selected or self-select to be involved and collaborative links are established between key stakeholders (road safety and transport authorities, police, government, school management, students) and community interest groups (parents and citizens associations).
- Investigating local issues and need—determining via travel surveys, questionnaires, consultation, observation and road network audits common routes used by children to access school, travel behaviour, and any associated problems.
- Developing and implementing an action plan—identifying solutions to problems which generally include a combination of engineering, education, enforcement and encouragement approaches. In Australian programs there is a strong focus on engineering and traffic-calming measures, such as kerb extensions, pedestrian safety islands, indented bus bays and marked bus waiting areas.
- Maintaining, monitoring and evaluating the program.

Queensland's Safe Routes to School style program gathers together a suite of initiatives within the Safe School Travel (SafeST) Package, implemented in 1997. The SafeST Package encourages all sectors of the community to play a role in the development and implementation of school transport safety strategies. Individual programs are introduced at the request of schools, and involve staff, students and families from the school, and staff from Queensland Transport, the Department of Main Roads, the Queensland Police and local government. The key programs of the SafeST Package are described below:

- The Safe School Bus Routes Program identifies routes with safety concerns and provides remedial funding (see later section on **Transport Planners**).
- The Safe Walking and Pedalling (SWAP) Program provides small-scale infrastructure funding and program funding (see below the "walking bus" and "bike train", see also later section on **Transport Planners**).
- The Speed Awareness Program helps drivers and school communities check the speeds of drivers around schools (see earlier section on **Drivers Around Schools**).
- The SafeST Subsidy Scheme is for large-scale infrastructure around schools, such as pick-up and setdown areas, bus bays, or pedestrian and cycle paths. Funding is provided by the Department of Main Roads and matched by local government funding.
- The School Crossing Supervisor Scheme has been operating since 1984 and now involves more than 1700 supervisors employed by Queensland Transport to monitor 980 pedestrian and children's crossings at 625 schools each morning and afternoon. There have been no school crossing-related fatalities or injuries on a supervised crossing since the scheme was introduced.
- The SafeST Package also provides a wide variety of educational and information resources (Ram & Moore, 2000) in the form of packs, stickers, publications and Internet resources.

Due to their multifaceted nature, it is difficult to analyse the effectiveness of Safe Routes to School programs in terms of reducing injuries. However, many Australian schools have developed an intersectoral road safety committee which highlights the value placed on Safe Routes to School programs as part of a community-owned school transport safety management strategy (Rose, 2000).

A Safe Routes to School program which encourages community ownership of school transport safety can serve as a tool to identify what resources are available in a community. For example, a number of jurisdictions in Australia and overseas have successfully implemented innovative forms of school transport such as the "walking bus" and "bike train" (Caunter & Browne, 2000) in which adult volunteers (often senior citizens) walk or cycle with a group of students to and from school via a safe route determined by key stakeholders and the community, picking up and dropping off students along the way.

Carmel College and Ithaca Creek State School in Brisbane are two examples of school communities taking initiatives to improve school transport safety. At Carmel College, school management has appointed an administrative officer to work closely with bus operators in the Capalaba area to ensure that students receive the best and safest possible public transport. This partnership enables regular communication and a strategic approach to issues such as student behavioural problems and transport planning. At Ithaca Creek, a proactive Parents' and Citizens' Association is committed to implementing a number of cost-free initiatives to encourage primary school children to walk and cycle in a safe road network to and from school. Some of the programs designed to highlight the social, environmental and health benefits associated with walking and cycling include:

- Smog Busters which encourages children to cycle and walk to save the environment
- Walk on Wednesdays
- The trial of a "walking bus" to be coordinated by volunteer senior citizens
- Red Sneaker Week, during which students from primary schools in the Gap Cluster in West Brisbane (Ithaca Creek State School, the Gap State School, Bardon State School, Payne Road State School and Oakleigh State School) will be encouraged to use alternative modes of travel to and from school under strict adult supervision. Students and schools will complete activity books and receive prizes for participation.

Newmarket State School in Brisbane offers prizes to children and parents for displaying correct or exemplary behaviour on the road. This form of positive reinforcement for effective parental modelling has promising implications for improving children's road crossing decisions.

Media professionals

The media can make a positive contribution to school transport safety, through improving community awareness of risks and assisting in the promotion of strategies that will be effective in improving safety.

In 1998, Queensland's Campaign 300 involved a partnership of government and media to increase community awareness. A concerted campaign might achieve positive outcomes for school transport safety.

Health Professionals

The treatment of those unfortunate enough to be injured in a school transport-related crash involves many levels of care: appropriate first aid, followed by emergency transport services, through to definitive care and rehabilitation.

The Task Force endorses the development of optimal standards of care at all levels in the management of the injured, resulting in the best possible outcome for the patient.

The Task Force recognises the specific challenges in providing optimal care in rural and regional Queensland and notes the support within the health professions for the development of statewide trauma pathways in the Queensland Emergency Medical System (QEMS).

Transport Planners

The Task Force acknowledges that many of the roles in school transport depend on one or more of the three levels of Australian government which determine public transport, road and education policy, funding and infrastructure. This overview has not set out to determine the specific roles of governments, except as they impact on transport planning and other areas of school transport.

Transport planners include professionals and senior managers from Queensland Transport, the Department of Main Roads, local governments, Education Queensland and the Department of Public Works and Housing. Given the high incidence of car, pedestrian and cyclist injuries, these people need to be heavily involved in school transport safety policy development.

Neilson (1990) found that engineering treatments (pedestrian refuge islands, increased curb space, chicanes, speed humps) to modify vehicle-approach speeds and other driver behaviour around schools successfully reduced accident frequency by up to 85 per cent in reduced speed areas. The SafeST Package includes a subsidy scheme for large-scale infrastructure around schools, such as pick-up and setdown areas, bus bays or pedestrian and cycle paths, funded by the Department of Main Roads and matched by local government funding. In the coming months, the Task Force will explore the role of transport planners in developing safer environments around schools.

The SafeST Package also includes the Safe School Bus Routes Program discussed in the following section.

School Bus Routes and Stops

Safe School Bus Routes

All Australian states have guidelines for bus routes and stops (Austroads, 2001a).

Under the Safe School Bus Routes program implemented in 1997, Queensland Transport reviews bus routes with identified hazards, and provides infrastructure funding subsidies to road authorities (Queensland Transport, 1998). As indicated earlier in the section under **Drivers of Other Vehicles**, 15 routes are reviewed each year and only five per cent of all routes have been reviewed to date.

Queensland Transport has provided a total of $1.8 million funding for remedial works on bus routes since the Safe School Bus Routes program's introduction. Many local authorities also contribute funding to complete additional works, bringing the total value of the program to date to more than $2.5 million (Donaghey & Chisholm, 2001).

In New South Wales, the 1992 School Bus Safety Task Force report recommended an examination of bus stops and bus routes to identify and reduce the use of locations which exacerbate the problem of children being hit by cars after alighting from a school bus. As part of a range of initiatives for school bus transport safety, the New South Wales Government introduced in 1999 a school bus black spot scheme to increase the safety of school bus stops with known safety issues, by installing warning and speed restriction signs reminding drivers that they must slow to 40kph when a bus is stopped in the black spot zone. A complementary program to move bus stops off high speed roads and onto lower speed side roads, where possible, was also introduced. To date, there has been no evaluation of this program.

Rural Bus Routes

The Queensland Department of Main Roads adopted design *Guide for Rural School Bus Routes and School Bus Stops* in 2001. The *Guidelines* outline factors to be taken into account when designing bus routes and deciding on the position of bus stops in rural areas (Department Main Roads, 2001). These factors include road surface condition, traffic delay and queuing, visibility, stopping sight distances, lane widths and road shoulders.

The Task Force noted that the *Guidelines* were only adopted in 2001 and would not yet have had an impact on rural bus route safety.

Bus Stops and Road-Crossing Options

Analysis of national road crash data (Austroads, 2001b) suggested that students who travel to and from school by bus, particularly primary school-aged students, tended to be more at risk around a bus than on a bus. The analysis of Queensland data also pointed to a higher risk of fatality and injury among bus pedestrians (walking to or from a bus) than among bus passengers.

A 1996 trial in New South Wales involved an on-road observational study of students alighting from a bus fitted with crossing control arms (Paine & Adams, 1996). The arms, which extend in front of a bus, force students to walk around to cross the road. The study revealed that some students waited until the control arm was retracted and the bus was moving to cross the road, and others were distracted by the arm, paying less attention to the road-crossing task. The report concluded that the installation of crossing arms on buses operating in NSW would decrease rather than increase the safety of children (Paine & Adams, 1996).

The School Bus Safety Task Force (1992) examined 1988–1989 New South Wales crash data involving school bus pedestrians during school travel times. The Task Force noted that a bus which has travelled 70 metres could still obscure a pedestrian on the side of the road from a motorist travelling in the opposite direction.

Tracking Systems for Buses

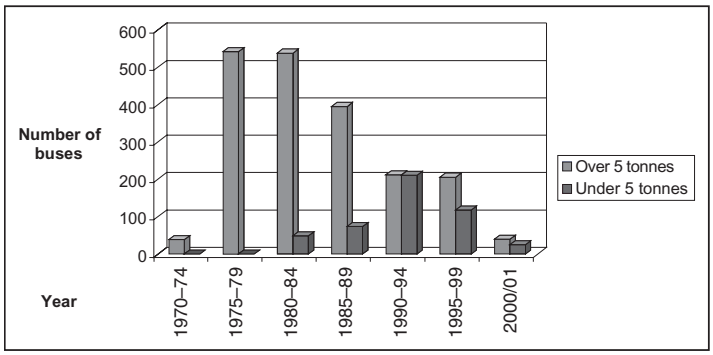
An electronic monitoring system for school buses was trialed in West Paterson, USA (Alvarado, 2000). The system included electronic ID tags, GPS and video-monitoring which tracked student pick-ups, scheduling and bus speed. Bus operators could use the system to determine if a bus had broken down or gone off route.

The Task Force found no data on vehicle tracking procedures in Australia. Vehicle tracking might have particular relevance for school buses in rural and remote areas of Queensland which are often at a distance from emergency services.

Bus Operators

Figure 4 provides a breakdown by age and size of the buses providing school transport services in Queensland.

Figure 4: Age of Queensland buses used for school transport



There are 2449 vehicles (37 per cent of all registered buses in Queensland) providing school transport services in Queensland, covering some 2000 bus routes throughout the state. Of the total, 1972 are heavy buses[11] (Queensland Transport, 2001).

The maximum age for a heavy bus in Queensland is 25 years, with provision for an extension of five years if the bus is upgraded. The maximum age for a light bus is 20 years.[12] There are stricter age limits on Open Classification for both heavy and light buses.[13]

The Task Force was concerned that more than half of all buses used for school transport in Queensland are more than 15 years old, and 30 per cent (n=609) of heavy buses are more than 20 years old. Three-quarters of the buses (n=1917) were built before 1992, which means they do not necessarily comply with the various design standards for safety, including rollover strength (Queensland Transport, 2001), discussed later under **Bus Designers and Policy-Makers**.

In Queensland, school and public passenger services are funded by a combination of cash fares from passengers and government funding which takes a number of forms:

- payment of the cost of providing bus transport to students eligible under the State Transport Assistance Scheme (STAS). This is a fee-for-service payment
- payment to operators to recompense them for government-specified concessions, eg children/pensioner discount fares
- operational funding to assist with the establishment of services that would not otherwise be viable
- assistance to purchase new and/or accessible buses for urban transport.

There are 1010 separate operators providing Government-supported school transport services in Queensland. More than half (54.7 per cent) are one-bus operators (Queensland Transport, 2001).

While not all school service operators receive government income for their services, the average government income per light bus is $35 500pa and per heavy bus is $46 500pa. In almost all cases charter income and cash fares supplement STAS income for bus operators.

Bus Designers and Policy-Makers

It is possible a disproportionate amount of attention is focused on bus design in this report—disproportionate in relation to the percentage of fatalities and hospitalisations among bus passengers relative to other modes of school transport in Queensland over the past 10 years. The Task Force has elected to provide the community with comprehensive and accurate information about bus design and its relationship to safety because of the number of submissions from community members relating to this topic and the level of attention given to it in the media.

Types of Bus Service

School students travel on three kinds of bus services:

- School services operated by contract service providers or schools themselves account for around 65 per cent (1600 buses) of the buses that carry children to and from schools in Queensland (Queensland Transport, 2001).
- Public passenger services, run by contract service providers including shire or city councils, account for the other 35 per cent (849 buses) of the buses that carry children to and from school in Queensland (Queensland Transport, 2001).
- School charter services, arranged by a school, use a provider of the school's choice (school excursions, camps).

Queensland Government funding under the School Transport Assistance Scheme (STAS) is provided for school services and for eligible students on public passenger services, with eligibility based mainly on distance from the nearest school. Some students also pay cash fares.

[11] A heavy bus has a Gross Vehicle Mass (GVM) of >5 tonnes.
[12] A light bus has a Gross Vehicle Mass (GVM) of 3.5–5 tonnes.
[13] Heavy buses can only have Open Classification (to travel unlimited distances) for 15 years; light buses for 10 years.

Types of Bus

All buses, whether they carry school students or not, are regulated by a complex framework of Commonwealth and State legislation which determines the distance and sometimes the speed a bus in a category can travel and the various design standards including safety standards that a bus in a particular category must meet.

New vehicle design and construction standards are specified under the Commonwealth *Motor Vehicle Standards Act 1989* which calls up the Australian Design Rules (ADRs) as the national standard for all road vehicles including buses. Particular standards apply to buses built with spaces for standing passengers (route service omnibuses[14]). These are the vehicles most likely to carry school students.

In Queensland, bus use is regulated according to the distance the bus is allowed to travel.

- Open Classification vehicles can travel unlimited distances.
- Regional Classification vehicles can travel in a 350km radius of first passenger pick-up.
- Local Classification vehicles can travel in a 40km radius of first passenger pick-up, or more than 40km if it is in a single or contiguous urban area.

Table 9 presents the different vehicles which might be used for school services in Queensland.

Carrying Capacity of Buses

In Australia carrying capacity of buses is weight-based and is determined at time of manufacture. Carrying capacity is limited by the lesser of:

- the Gross Vehicle Mass (GVM) of the bus
- the manufacturer's axle load limits, or
- regulatory axle load limits.

In Queensland, this is the only carrying limitation on buses, except for limits on the numbers of standees (see next section).

The Task Force understands that enforcement of vehicle loading limits is undertaken by Queensland Transport inspectors at random intervals, and in response to public complaints. The Task Force has requested data on the frequency and results of inspections of vehicles used for school and public passenger services.

Standees

All states in Australia currently permit the carriage of passengers who have to stand because all seats are taken (standees). Standees are only permitted on route service buses, which are buses specially designed with spaces for standing passengers. Route service buses are the most commonly used vehicle for public passenger and school services in Queensland. Non-route service buses, which are sometimes used on school services, are not allowed to carry standing passengers.

Operators and drivers in breach of the standee regulation are issued with a notice under Section 100 of the *Transport Operations (Public Transport) Act 1994*, and may be fined or lose Operator Accreditation and Driver Authorisation if they continue to offend.

Queensland's *Transport Operations (Public Transport) Standard 2000* prohibits buses from carrying standees on roads that have been identified as being a long, steep descent or very steep descent according to guidelines set out under the Department of Main Roads *Manual of Uniform Traffic Control Devices* (1995).

Table 9: Bus classification and type of service

Type of service	Vehicle classification				
	Queensland			Commonwealth (Australian Design Rules)	
	Open (unlimited distance)	Regional (<350km radius)	Local (<40km radius unless single/contig urban area)	Route Service (standing passengers)	Non-Route Service (no standing passengers)
School service	Unlikely	Possible	Likely	Likely	Possible
Public passenger service	Unlikely	Possible	Likely	Likely	Possible
School charter service	Possible	Possible	Possible	Possible	Possible

[14] An omnibus is a passenger vehicle having more than nine seating positions including that of the driver.

In the USA, the National Highway Traffic Safety Administration (NHTSA) Highway Safety Program *Guideline 17* specifically states that every student travelling on a school bus should be seated before the bus is in motion (NHTSA, 1991). The NHTSA view was that allowing children to travel as standees meant that they were not afforded the protection of compartmentalisation[15] in the event of a crash. Despite this advice, some states and school districts in the US have policies that allow children to stand on school buses.

Number of Standees Allowed

Standee capacity is calculated in a number of different ways across Australia. In Queensland, within the limits of a vehicle's weight-based carrying capacity, standee capacity is determined by the number of handholds on the bus (the number of standees must not exceed the number of handholds). Depending on size, a bus used for a public passenger or school service could have up to 25 handholds.

In early 2001, Queensland Transport conducted a trial on public passenger services in the Beaudesert area (Cluff & Dwyer, 2001) where buses were limited to no more than five standees per square metre of aisle. To achieve this limit, two extra vehicles were required and routes were reorganised. Standee rates were 6.9 per cent of total passengers carried during the trial. The report concluded that the trial had reduced the number of standees on the school services involved, but adoption of the standee limits for all school services would require significant extra funding (Cluff & Dwyer, 2001).

State road authorities in other jurisdictions calculate standee limits for those buses allowed to carry standees by a variety of methods including one standing passenger per row of seats, 6.2 standing passengers per square metre of aisle space, standing passengers equal to 50 per cent of adult seating capacity, or specified number limitations (eg 20 per bus in Victoria).

Time or Distance Limits on Standees

The Queensland Parliamentary Travelsafe Committee (1993) recommended that the safety of standees be managed by:

- limiting the distance standees could travel to reduce exposure to risk
- restricting the areas of the bus where standees were permitted
- limiting the speed of buses carrying standees
- identifying and banning standees from hazardous routes (Queensland Parliamentary Travelsafe Committee 1993).

In response, the Queensland Government mandated a 20 kilometres distance limitation on the carriage of standees under the *Transport Operations (Public Transport) Standard 2000*.

Other states that limit the time or distance that standees can be carried are South Australia (20 minutes), Tasmania (10 kilometres), and Victoria (10 kilometres on some buses, no limit on public passenger services).

Risk to Standees

The only Australian research on the carriage of standees was conducted by Henderson (1996b) who, based on the fact that the injury risk to bus passengers in Australia is low, determined that the additional risk of travelling as a standing passenger was small. Henderson (1996b) examined school bus crashes in NSW from 1989 to 1992 and calculated that the total cost to the community (incorporating medical costs, rehabilitation, loss of work) of injuries to student standees in New South Wales totalled between $50 000 and $60 000 per year (Henderson, 1996b). Henderson (1996b) concluded that eliminating the risk exposure of standees by banning them would cost thousands of times more than the value of the injuries saved.

Three-for-Two Seating

The carriage of three children of up to 12-years-old on a bench-style seat designed for two adults (three-for-two seating) is common to all Australian States and Territories except the Australian Capital Territory (Austroads, 2001a) where three-for-two seating is not allowed.

In reporting the outcomes of the New South Wales Bus and Coach Safety Standing Committee investigation into school bus safety, Johnson (1993) found no evidence to suggest student safety was compromised with three-for-two seating. Johnson (1993) also found that eliminating three-for-two seating would increase the cost of bus travel in New South Wales by 16 per cent.

[15] Compartmentalisation is a US-based design standard which keeps a passenger within an individual seat area and makes the area safe by use of padding.

Bus Design for Safety

Rollover Strength

Tidbury (1984) noted that bus rollover is the most serious cause of injury and fatality among bus passengers. The risk of injury to passengers in bus crashes depends on a combination of acceleration forces and intrusion into the bus interior or survival space (Irwin and Faulks, 2000).

In Australia, heavy buses built after 1 July 1992 and light buses built after 1 July 1993 are required to comply with Australian Design Rule (ADR) 59/00 for rollover strength. The only exception is ultra-low-floor buses, such as Brisbane Transport's new wheelchair-accessible buses, which are too low to the ground to be at risk of rollover.

Currently, 80 per cent of buses used in school transport in Queensland (n=1917) were built before 1992 and will not necessarily comply with the rollover strength ADR (Queensland Transport, 2001).

An international comparison of rollover strength was undertaken for the Asia Pacific Economic Corporation, which found that the only existing regulations for rollover strength are in Australia and Europe (APEC, 1997). The Australian requirements are identical to those of the European Commission.

Padding

Henderson and Paine (1994) noted that most injuries in crashes involving heavy buses were minor facial and head injuries. They recommended padding be installed on unyielding seat tops and handholds be redesigned with impact-absorbing materials.

Padding requirements for buses operating in Queensland are outlined in the information bulletin, *Safety Padding for Bus Handrails, Seats and Partitions* (Queensland Transport, 2001). All buses which entered service in Queensland on or after 1 January 1997, and Regional Class (radius of <350km) buses less than 20 years old on 1 January 1997, are required to have impact-absorbing padding on those areas of the bus likely to strike the head of a seated occupant in a frontal collision, such as handrails, tops of seats, and seat posts.

Details of how many Queensland buses meet the standard for padding specified in the information bulletin were not available. In a self disclosure survey, responding bus operators indicated that 61 per cent of buses used in school transport have padding on seats. These buses may also have other padding (on handrails etc). (Queensland Transport, 2001).

School buses in the USA and Canada are required to have high-back, closely spaced, padded seats as part of the principle of compartmentalisation (which keeps the passenger within the individual seat area in a frontal collision). In the United Kingdom, padding is required in those buses that are fitted with lap seat belts. (Department of the Environment, Transport and the Regions, 1996).

Seat Belts

Currently, seat belts are required on buses covered by Australian Design Rule (ADR) 68/00 "Occupant Protection in Buses". ADR 68/00:

- applies to heavy buses built since 1 July 1994 and light buses since 1 July 1995 designed for travel on the open road (in Queensland, these would be Open Classification buses)
- contains the requirement for seat belts, seat strength, seat anchorages, seat belt anchorages, child restraint anchorages, and impact attenuation characteristics of seat backs and arm rests
- does not apply to route services buses, or buses with fewer than 17 seats.

Most vehicles used on school and public passenger services in Queensland are route service buses which do not need to comply with ADR 68/00. Bus operators have voluntarily installed lap belts on 130 of the 2449 buses used for school services. A further 100 buses have lap-sash belts on some seats; the majority of these are light buses (Queensland Transport, 2001).

The issue of seat belts in school buses has been widely debated in the USA. Four states, New Jersey, New York State, Louisiana and Florida, now require school buses to have lap belts (National Transport Safety Bureau, 1999).

In 1998 the United Kingdom introduced a requirement for seat belts (minimum lap belts with associated padding) on coaches[16] and minibuses carrying children on organised journeys (trips to and from school, excursions) in high-speed environments (Department of the Environment, Transport and the Regions, 1996).

[16] In the UK, a coach is a bus capable of carrying more than 16 passengers, with a GVM over 7.5 tonnes and a maximum speed of more than 60mph.

Currently, no Australian state requires seat belts on school buses (Austroads, 2001a). There has been extensive research and debate on the extent to which seat belts improve safety in buses and the kinds of buses and seat belts that might lead to improved safety. The issues relating to school transport include rollover strength and seat belt safety, the problems fitting seat belts to existing buses, lap belts or lap-sash belts and safety, and injury risk reduction through seat belt use.

- **The relationship between bus rollover strength and seat belt safety**

  In Australia, seat belts may be retrofitted to existing buses under the *Guidelines for Voluntary Modification of Existing Buses and Coaches to Improve Occupant Protection* (Federal Office of Road Safety, 1995). The background paper to these *Guidelines* noted that in a rollover crash involving a pre-rollover-strength (ADR 59/00) frame, the risk of injury to the wall-side passengers from side-wall intrusion or roof collapse is increased for occupants restrained by seat belts (Federal Office of Road Safety, 1995). However, the paper also suggested that the additional benefits afforded by seat belts outweighed the risk of side-wall intrusion. For this reason, the *Guidelines* recommended that lap-sash belt-equipped seats be fitted when seats are replaced in any vehicle which can be modified to provide the appropriate mounting strength even if the vehicle does not comply with ADR 59/00.

- **Fitting seat belts to existing buses used for school transport**

  Seat and anchorage reinforcement is essential when fitting seat belts in buses. Dixon, et al, (1981) found that seat belts in buses would be rendered almost useless in the event of a crash if a seat collapsed. Ninety per cent of the buses transporting students to and from school in Queensland (n=2204) do not have provision for the installation of seat belts in the form of reinforced seats and anchorages (Queensland Transport, 2001).

  Henderson and Paine (1994) pointed out that the need to strengthen the underfloor structure when fitting seat belts means that some buses cannot practically be fitted with belts, as many underfloor areas are inaccessible because of the close proximity of the engine, fuel tank and luggage bins.

  Advice from Queensland Transport indicates that bus operators who have retrofitted seat belts to existing buses paid between $110 and $660 per seat, depending on the style of belt, and whether new seats and anchorages were required. Currently, many of the buses carrying school students are allowed to carry standing passengers, and some have three-for-two seating. There would be an additional cost associated with fitting seat belts if standees and three-for-two seating were discontinued in order to provide every student with a belted seat.

- **The use of lap belts or lap-sash belts on buses**

  Research has compared the effects of restraining children in lap and lap-sash seat belts[17].

  In the USA and Canada, school buses are required to meet standards for compartmentalisation (which keeps a passenger within the individual seat area and makes the area safer in a collision by use of padding etc). Because there is no directly comparable Australian standard for compartmentalisation, US and Canadian research does not translate exactly to the Australian context, although the results of crash tests on lap belts are relevant.

  Farr and Eng (1985) conducted crash tests using lap-belted and unbelted dummies in buses meeting compartmentalisation standards. Lap-belted dummies pivoted at the waist and struck the seat back in front of them, resulting in an increase in head accelerations. Farr and Eng (1985) determined that lap belts may increase the risk of injury to bus occupants in buses which meet compartmentalisation standards. Similar results were found by the National Highway Traffic Safety Administration (McCray, 2001), the National Transport Safety Bureau (1999), the University of Florida (Baltes, 1998), and Transport Canada (Gardner & Marie, 1999). However, the National Transport Safety Bureau (1999) recommended that occupant protection systems which provide additional protection in rollover and side impact crashes be investigated.

- **Reduced injury risk with seat belts in buses**

  When examining the effectiveness of seat belts in bus crashes, Henderson and Paine (1994) noted that the extent of reduced

[17] Lap-sash seat belts are the seat belts used in car front seats in Australia.

injury risk to passengers on route service buses fitted with seat belts was unknown, due to a lack of data on bus crashes. However, based on international crash dynamics research and seat design in Australia, Henderson and Paine (1994) indicated that the reduction in injury risk would be unlikely to exceed 20 per cent, if seat belts were worn consistently and properly, compared with a 50 per cent injury reduction achieved when seat belts were fitted and worn in cars. Henderson and Paine (1994) suggested that seat belts (and in particular, lap-sash belts) would be much more effective (up to 50 per cent) in small buses similar to passenger cars (eg people movers).

School Bus Doors and Exits

Buses built after 20 May 1992 must comply with ADR 44/02 which specifies requirements for the placement, dimension and number of emergency doors, emergency windows and escape hatches, as well as signage requirements and instructions for use. Buses built pre-1992 must comply with similar standards outlined in Section 6 of the Omnibus Licensing Evaluation. Most buses used on school services in Queensland comply with ADR 44/02 or its predecessor standard.

In response to the deaths of two children trapped in rear bus doors in 1995, the NSW Bus Safety Advisory Committee investigated bus door safety (Henderson, 1995). The Committee recommended that the NSW Motor Traffic Regulations be amended to include bus door safety systems to prevent entrapment in rear and centre doors. Recommendations included door sensors which activate the brake system and give an audiovisual alarm if an obstruction is detected, and changes to door seals and closing pressure. A subsequent report recommended these mechanisms also be introduced for front doors in buses (Henderson, 1996a). In NSW, these recommendations have been implemented under the *Motor Traffic Amendment (Bus Safety Regulation) 1997*. There is no similar requirement in Queensland, although some bus operators have chosen to introduce door safety mechanisms into their fleet.

Identifying School Buses

Warning Signs and Flashing Lights

All Australian states require buses used for school services to be fitted with warning signs and flashing lights which must be in operation whenever the bus is picking up and setting down passengers (Austroads, 2001a).

The most visible school bus warning sign identified by research (Cairney, 1992) was a fluorescent yellow sign. This has been adopted by all Australian states as part of *National Regulations – Australian Vehicle Standards Rules 1998*, and in Queensland under the *Transport Operations (Road Use Management – Vehicle Standards and Safety) Regulation 1999*.

The Western Australian School Bus Safety Committee's evaluation (School Bus Safety Committee, 1997) examined motorist behaviour around buses with and without flashing lights. Vehicle speeds reduced by up to 11kph for a stopped bus using flashing lights, which was double the reduction achieved for a stopped bus not using the flashing lights. Vehicles also altered course by braking and moving away from the bus with flashing lights and across the centre line. (School Bus Safety Committee, 1997).

Flashing lights and warning signs have been required on all Queensland buses used "exclusively for the carriage of school children" since 1979, now under the *Transport Operations (Road Use Management – Vehicle Standards and Safety) Regulation 1999*. This regulation was introduced retrospectively, so all school buses that meet the definition of being exclusively for the carriage of school children must use the flashing lights and warning signs. These account for approximately 65 per cent of all the buses that carry school students to and from school in Queensland.[18]

While the current Queensland legislation requires lights on buses "exclusively for the carriage of school children", a bus operator could avoid the installation of lights simply by carrying fare-paying adult passengers. The Task Force was provided with anecdotal evidence that this has occurred.

A survey conducted by Market and Communications Research (2001) in Queensland revealed that 70 per cent of 200 households surveyed were aware that school buses are identified by the presence of warning signs.

School Bus Colour

School buses in the USA and Canada are a uniform "school bus yellow" under standards introduced in 1978. In Australia, uniform

[18] Buses used on public passenger services that carry school students are not required to use lights and signs, as these are not school buses.

school bus colour is used in Western Australia, where contract school buses are required to be orange and green. A public opinion survey of school bus initiatives in 1999 revealed a high level of support for the colour scheme (Western Australia Department of Transport, 1999).

In Tasmania, the School Bus Safety Review Committee (1992) considered the use of a common colour for school buses. No action was taken on the issue as most buses in the Tasmanian fleet are not dedicated school buses.

Queensland Transport trialed the use of fluorescent yellow and orange high visibility strips on six school buses in urban and rural areas of Queensland, with the aim of increasing motorist awareness that the bus is carrying school children. Preliminary results of focus group sessions with school communities indicated support for the colour scheme and the use of the strips (King, 1999). However, there was little awareness of the trial and purpose of the strips.

SCHOOL TRANSPORT SAFETY: THE NEXT STEPS

Faced with the challenge of reviewing and improving school transport safety in Queensland, the Task Force has developed a six-month work plan that draws on:

- current research on school transport safety
- advice from experts with specialist knowledge in core areas of school transport and bus safety
- contributions from interested members of the community.

This preliminary *Overview of Research and Practice* identifies areas of greatest risk in school transport in Queensland and presents the results of a review of current research, policy and practice in school transport safety throughout Australia and internationally. The effectiveness of specific policies and practices will be further examined during the remainder of the review to develop recommendations that best integrate engineering, enforcement and educational approaches to improve the safety of students as they travel to and from school.

The Task Force is currently completing its analysis of the many submissions received from community members, schools and other stakeholder organisations and looks forward to interviewing some of the respondents. The Task Force is also interviewing experts and professionals in road safety research, road engineering and transport planning, education, policing, health and emergency services, transport management and bus design. Community, stakeholder and expert opinion will inform the Task Force's final report and ensure that recommendations reflect community concerns and effective responses to them.

GLOSSARY OF TERMS USED

Bus pedestrian: A person walking to board or after alighting from a bus

Compartmentalisation: A USA design standard for school buses incorporating high-backed seats and energy-absorbing padding to provide a passive restraint system for passengers. The standard aims to keep passengers within the confines of the individual seat area in the event of a frontal collision

Gross Vehicle Mass: the maximum laden mass of a bus as specified by the manufacturer

Heavy bus: a bus with a Gross Vehicle Mass (GVM) of more than 5 tonnes

Hospitalisation: admission to hospital

Light bus: a bus with a GVM of 3.5–5 tonnes

Omnibus: a passenger vehicle having more than nine seating positions including that of the driver

Rollover strength: the strength of a bus structure to withstand the forces and maintain passenger survival space in the event of a rollover crash

Route service bus/omnibus: a bus built with provision for standing passengers

Standee: a passenger who must stand because all available seats have been filled

STAS (School Transport Assistance Scheme): the Queensland distance and income eligibility based scheme that funds student transport

Three-for-two seating: the practice of carrying three primary school-aged children on a bench seat designed for two adults

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APPENDIX 1

Major Bus Crashes Involving School Students

The following list is compiled from media reports of recent bus crashes in Australia involving school students. The list cites deaths and hospitalisations from collisions and rollover crashes involving buses.

The list does not include deaths and serious injuries among student pedestrians or among students struck by other vehicles walking to board or after alighting from school buses.

Date	Location	Description of Crash	Fatalities	Hospitalisations
Feb 1987	En route from Tinaroo Dam to Cairns, Qld	The brakes on a 20-year-old chartered bus (pre-rollover-strength) with 43 school students failed on a steep descent. The bus went over a cliff edge and rolled over several times. Rust damage to the bus meant the roof peeled off.	8 (students)	23
Apr 1988	Kenwick-Madding WA	Bus rolled over	0	7 (1 adult, 6 students)
Sep 1993	Coober Pedy, SA	A chartered bus carrying 40 school students and five adults overturned on an isolated dirt road approximately 70km east of Coober Pedy. Passengers spent two hours trapped in the wreckage until the Royal Flying Doctor Service arrived.	1 (student)	12 (students)
Aug 1994	Dandaragan-West, SA	Truck attempted to overtake a bus which was indicating its intention to turn right. The bus careened down the highway, eventually crashing into the back of the truck.	0	1 (bus driver)
Nov 1994	Kalgoorlie, WA	Driver coming from opposite direction crossed over concrete road divider and crashed into front of bus	1 (car driver)	0
Jun 1996	Maitland, NSW	An afternoon school bus carrying 24 students collided with a car (driven by a learner driver) at an intersection. The bus veered into a tree in the front yard of a house.	0	1 (student)
Jul 1996	Lake King, Mt Madden, WA	Bus travelling through an intersection collided with a car.	0	1 (student)
Oct 1997	Bathurst, NSW	A bus carrying around 30 primary school students from the small community of Raglan collided with another vehicle at the intersection of the Great Western Highway at about 8.30am.	0	7 (bus driver + 6 students)
Nov 1997	Nambucca Heads, NSW	A car lost control while turning left and skidded into a school bus at 8.13am.	0	6 (students)
Nov 1998	Warrego Highway outside Toowoomba, Qld	A 28-seater bus carrying students from Oakey to special schools in Toowoomba collided with a car at around 8am.	2 (teacher + student, both in car)	0
Jun 1999	Newcastle, NSW	Two school buses, carrying 65 students from primary and secondary schools, collided at Lemon Tree Passage, just north of Newcastle at about 8.25am.	0	14 (2 bus drivers + 12 students)

Date	Location	Description of Crash	Fatalities	Hospitalisations
Jan 2001	Nuriootpa (Barossa Valley), SA	A large school bus collided with a truck on a country road in the afternoon.	1 (driver)	11 (students)
Feb 2001	Wandandian/ Ulladulla, South Coast of NSW	At about 4pm, a school bus carrying 36 students from St John's High School (South Nowra) along the Princes Highway collided with a utility and crashed on to its side. A third vehicle travelling behind the bus hit the wreckage.	2 (student + driver of the utility)	21 (students)
Mar 2001	Cedar Grove, Qld	At 3.30 pm a bus carrying school students ran into the back of another bus on the Mt Lindsay Highway.	0	2 (students)
Mar 2001	Gracemere, Qld	A bus travelling from Rockhampton to Mt Morgan carrying 30 school students and 15 adults rolled over after being hit from behind by a semi-trailer at about 7.40am.	0	6 (2 adults + 4 students)

APPENDIX 2
NATIONAL ROAD CRASH DATA

Notes on Databases

1. The *Monthly Fatality Database* records the number of persons killed in crashes on Australia's roads each month and is compiled from data obtained from police reports in each State/Territory jurisdiction.
2. The *Serious Injury Database* houses information on all crashes resulting in death or hospitalisation. This database contains more detailed crash information and is compiled quarterly from police report data coded by each State/Territory jurisdiction. The *Serious Injury Database* is currently complete for the period 1990 to 1997 inclusive.
3. The *Fatality File*, compiled from coroner's reports and police reports, is a comprehensive database that contains detailed information on all aspects of each fatal crash. Prior to 1997, the *Fatality File* was only compiled every second year [ie 1988, 1990, 1992, 1994 and 1996] due to the expense and time associated with such detailed analyses. The *Fatality File* is the only database with sufficiently detailed information to identify individual crashes directly related to school transport safety. Compilations of the *Fatality File* after 1997 are incomplete.

5–17-year-olds Killed or Hospitalised: Morning and Afternoon Crashes by Years 1990–2000

Number of 5–17-year-old pedestrians killed in road crashes in the morning and afternoon on school days in Australia 1990–2000

Year	Morning (8am–10am)	Afternoon (3pm–5pm)	Total
1990	5	22	27
1991	4	14	18
1992	4	13	17
1993	4	11	15
1994	1	13	14
1995	1	10	11
1996	4	3	7
1997	1	3	4
1998	0	8	8
1999	0	6	6
2000	5	4	9
1990–2000	29	107	136

Source: Monthly Fatality Database 1990–2000

Number of 5–17-year-olds hospitalised in road crashes in the morning and afternoon on school days in Australia 1990–2000

Year	Morning (8am–10am)	Afternoon (3pm–5pm)	Total
1990	83	277	360
1991	65	230	295
1992	63	226	289
1993	57	192	249
1994	66	201	267
1995	52	192	244
1996	64	170	234
1997	56	157	213
1990–1997	506	1645	2151

Source: Serious Injury Database 1990–1997

Number of 5–17-year-old pedestrians killed in road crashes in the morning and afternoon on school days by State/Territory, Australia 1990–1998

Time of day	State/Territory								Australia
	NSW	Qld	Vic	SA	WA	Tas	NT	ACT	
Morning (8am–10am)									
1990	0	2	0	2	1	0	0	0	5
1991	0	2	0	1	1	0	0	0	4
1992	1	0	2	1	0	0	0	0	4
1993	2	0	0	1	1	0	0	0	4
1994	1	0	0	0	0	0	0	0	1
1995	0	0	1	0	0	0	0	0	1
1996	1	1	1	1	0	0	0	0	4
1997	0	0	0	0	1	0	0	0	1
1998	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0
2000	4	0	1	0	0	0	0	0	5
1990–2000 (Morning)	**9**	**5**	**5**	**6**	**4**	**0**	**0**	**0**	**29**
Afternoon (3pm–5pm)									
1990	11	5	5	0	0	1	0	0	22
1991	5	3	6	0	0	0	0	0	14
1992	5	4	3	1	0	0	0	0	13
1993	5	4	2	0	0	0	0	0	11
1994	3	4	1	2	3	0	0	0	13
1995	5	3	0	1	1	0	0	0	10
1996	3	0	0	0	0	0	0	0	3
1997	0	1	1	0	1	0	0	0	3
1998	1	1	4	1	0	0	1	0	8
1999	1	1	1	1	1	1	0	0	6
2000	0	1	1	0	1	1	0	0	4
1990–2000 (Afternoon)	**39**	**27**	**24**	**6**	**7**	**3**	**1**	**0**	**107**
Total (am + pm)									
1990	11	7	5	2	1	1	0	0	27
1991	5	5	6	1	1	0	0	0	18
1992	6	4	5	2	0	0	0	0	17
1993	7	4	2	1	1	0	0	0	15
1994	4	4	1	2	3	0	0	0	14
1995	5	3	1	1	1	0	0	0	11
1996	4	1	1	1	0	0	0	0	7
1997	0	1	1	1	2	0	0	0	4
1998	1	1	4	1	0	0	1	0	8
1999	1	1	1	1	1	1	0	0	6
2000	4	1	2	0	1	1	0	0	9
1990–2000 (am + pm)	**48**	**32**	**29**	**12**	**11**	**3**	**1**	**0**	**136**

Number of 5–17-year-old pedestrians hospitalised as a result of road crashes in the morning and afternoon on school days by State/Territory, Australia 1990–1997

Time of day	State/Territory								Australia
	NSW	Qld	Vic	SA	WA	Tas	NT	ACT	
Morning (8am–10am)									
1990	29	16	21	8	7	1	1	0	83
1991	21	10	21	3	6	4	0	0	65
1992	18	10	23	3	6	1	0	2	63
1993	16	8	23	4	6	0	0	0	57
1994	25	6	23	3	4	3	1	1	66
1995	11	7	21	4	5	1	1	2	52
1996	26	8	17	2	6	4	0	1	64
1997	20	7	18	2	4	1	1	3	56
1998	*Not Available*								
1999	*Not Available*								
2000	*Not Available*								
1990–2000 (Morning)	**166**	**72**	**167**	**29**	**44**	**15**	**4**	**9**	**506**
Afternoon (3pm–5pm)									
1990	103	36	76	28	23	7	2	2	277
1991	81	37	51	23	24	10	1	3	230
1992	96	40	40	13	24	10	1	2	226
1993	76	36	41	13	19	5	1	1	192
1994	73	45	48	6	21	4	2	2	201
1995	74	38	47	12	13	5	0	3	192
1996	50	28	54	14	17	3	1	3	170
1997	60	24	39	7	19	3	3	2	157
1998	*Not Available*								
1999	*Not Available*								
2000	*Not Available*								
1990–2000 (Afternoon)	**613**	**284**	**396**	**116**	**160**	**47**	**11**	**18**	**1645**
Total (am + pm)									
1990	132	52	97	36	30	8	3	2	360
1991	102	47	72	26	30	14	1	3	295
1992	114	50	63	16	30	11	1	4	289
1993	92	44	64	17	25	5	1	1	249
1994	98	51	71	9	25	7	3	3	267
1995	85	45	68	16	18	6	1	5	244
1996	76	36	71	16	23	7	1	4	234
1997	80	31	57	9	23	4	4	5	213
1998	*Not Available*								
1999	*Not Available*								
2000	*Not Available*								
1990–2000 (am + pm)	**779**	**356**	**563**	**145**	**204**	**62**	**15**	**27**	**2151**

APPENDIX 3
QUEENSLAND DATA

Year Breakdown of School Transport-Related Fatalities and Hospitalisations in Queensland 1991–2000

Year	Mode of transport													
	Private car		Pedestrian		Cyclist		Bus pedestrian		Bus passenger		Motorcyclist		All modes	
	Fat.	Hosp.	Fat.	Hosp.	Fat.	Hosp.	Fat.	Hosp.	Fat.	Hosp.	Fat.	Hosp.	Fat.	Hosp.
1991	3	24	1	36	1	47	2	3	0	3	0	0	7	113
1992	4	40	2	41	2	48	2	8	0	0	0	0	10	137
1993	3	39	3	43	0	49	1	4	0	1	0	4	7	140
1994	3	38	2	45	0	46	3	5	1	2	0	0	9	136
1995	3	41	3	38	2	54	1	6	0	1	0	1	9	141
1996	3	38	2	27	2	45	0	7	0	1	0	1	7	119
1997	3	40	1	30	0	38	0	3	0	1	0	4	4	116
1998	4	38	1	33	2	47	0	7	0	2	0	4	7	131
1999	1	47	1	40	0	49	0	6	0	1	0	2	2	145
2000	2	40	1	33	0	52	0	14	0	1	0	1	3	141
TOTAL	**29**	**385**	**17**	**366**	**9**	**475**	**9**	**63**	**1**	**13**	**0**	**17**	**65**	**1319**

Source: Queensland Road Crash Information System 1991–2000

APPENDIX 4 DESIGN STANDARDS FOR BUSES

Buses as vehicles in Queensland are regulated according to the following classifications:

- *Open Classification*—a vehicle classified for open use is permitted to operate over an unlimited distance.
- *Regional Classification*—A vehicle classified for regional use is permitted to operate within a radius of 350km from the point of the first passenger pick up.
- *Local Classification*—A vehicle classified for local use is permitted to operate within a radius of 40km from the point of the first passenger pick up or a radius exceeding 40km, providing the journey is entirely within a single or contiguous urban area.

Under the Transport Operations (Road Use Management—Road Rules) Act, a "School Bus" is a bus used exclusively for the carriage of children to and from school.

Under the Transport Operations (Passenger Transport) Act, a "School Service" is a 40-week a year services provided school days only for which the principal purpose is the transport of school children to and from school.

There are currently many Australian Design Rules (ADRs) pertaining to buses. The following table provides information on what ADRs are required for each classification (noted in italics) of bus operating in Queensland.

Under the Commonwealth Motor Vehicle Standards Act, a Route Service Omnibus or Bus is a bus specially designed with spaces for standing passengers.

There are also a number of standards that apply to school buses under Queensland regulations, such as the installation of flashing lights and warning signs on school buses used 'exclusively for the carriage of school children', safety padding for bus handrails, seats and partitions, and cosmetic standards.

Standard required	Open Classification	Regional Classification	Local Classification
School bus flashing lights and signs	For buses used exclusively for the carriage of school children *(Transport Operations (Road Use Management) Act*	For buses used exclusively for the carriage of school children *(Transport Operations (Road Use Management) Act*	For buses used exclusively for the carriage of school children *(Transport Operations (Road Use Management) Act*
Maximum Age – *Heavy bus* – *Light bus* – Forward control and off road passenger vehicle	15 years 10 years 10 years	25 years 20 years 10 years	25 years 20 years 10 years
Australian Design Rules	Applicable to non route service buses with high back seats inc. ADR 68	Applicable to non route service buses inc. ADR 68	Applicable to route service buses
Seating for buses	Forward or rearward facing coach style (high back) seats	Forward, rearward or side facing, high or low back seats	Forward, rearward or side facing seats

Australian Design Rules for buses

ADR 1/00 **Reversing Lamps** which specifies the requirements for reversing lamps to warn pedestrians and other road users that the vehicle is reversing. 1 July 1973 for light and 1 July 1975 for heavy buses.

ADR 4/03 **Seat Belts** which specifies requirements for seat belts. 1 January 1969.

ADR 5/04 **Seat Belt Anchorages** which specifies the requirement for a lap belt on the drivers seat. 1 January 1969.

ADR 6/00 **Director Indicator Lamps** which specifies the photometric requirements for turn direction indicator lamps. 1 January 1973.

ADR 7/00 **Hydraulic Indicator Lamps** which specifies the photometric for turn direction indicator lamps. 1 January 1970.

ADR 8/01 **Safety Glazing Material** which specifies the performance requirements for material used in both external and internal glazing to ensure adequate visibility, minimise obscuration if shattered and minimise the likelihood of serious injury if a person comes into contact with the broken glazing material. 1 July 1971.

ADR 12/00 **Glare Reduction in the Field of View.** The function of this ADR is to minimise the glare from certain surfaces in the field of view of the driver. 1 July 1973.

ADR 13/00 **Installation of Lighting and Light Signalling Devices.** ADR 13/00 specifies requirements for the installation of lights and light signalling devices on the vehicle to ensure appropriate operation. 1 October 1991.

ADR 14/02 **Rear Vision Mirrors** which specifies the number, position and size of rear vision mirrors to provide the driver with a clear and reasonably unobstructed view to the rear. 1 July 1992.

ADR 15/01 **Demisting of Windscreen** which specifies standards for equipment to keep the windscreen clear of mist so that the drivers forward view is not obscured. 1 January 1987 for omnibuses up to 3.5 tonnes GVM.

ADR 16/01 **Windscreen Washers and Wipers** which specifies requirements for windscreen wipers and washers to ensure reasonable visibility through the windscreen in inclement weather. 1 January 1987 for omnibuses up to 3.5 tonnes GVM.

ADR 18/02 **Instrumentation** which specifies requirements for the provision, location and accuracy of certain instrumentation including speedometers and odometers. 1 January 1973.

ADR 24/02 **Tyre and Rim Selection**. This ADR specifies requirements for tyres and rims appropriate to vehicle load capacity, rim size requirements and vehicle speed characteristics. 1 January 1987.

ADR 28/01 **External Noise of Motor Vehicles** which specifies limits for the external noise of motor vehicles in order to limit the contribution of motor traffic to community noise. 1 July 1974.

ADR 35/01 **Commercial Vehicle Brake Systems** which specifies braking performance under both normal and emergency conditions. 1 July 1975.

ADR 42/03 **General Safety Requirements**. This rule specifies design and construction requirements to ensure the safe operation of the vehicle and covers issues such as steering systems, controls for automatic transmissions, electrical wiring, electrical connectors, positioning of exhaust outlets, minimisation of internal and external protrusions to reduce the risk of injury, mudguards, ventilation and warning devices. 1 July 1992.

ADR 43/03 **Vehicle Configuration and Dimensions** which specifies the requirements for vehicle configuration and dimensions. 1 July 1991.

ADR 45/01, ADR 46/00, ADR 47/00, ADR 48/00, ADR 49/00, ADR 50/00, ADR 51/00, ADR 52/00.

These ADRs which set out the photometric requirements for lights, light signalling devices and reflectors. 1 July 1992.

ADR 44/02 **"Specific Purpose Vehicle Requirements"** contains the requirements for emergency exits for MD3, MD4 and ME vehicles (ie. buses greater than 3.5 tonnes GVM) designed for more than 16 passengers in addition to driver and crew. There is no differentiation between route service and non-route service buses. 1 July 1993.

ADR 58 **"Requirements for Omnibuses designed for Hire and Reward"**, 1 July 1988, contains a series of requirements for buses including:

- Occupant capacity—based on 65 kg per person plus 15 kg of luggage where luggage space is provided
- Aisle requirements—380 mm for route service buses and buses with less than 25 person capacity, otherwise 300 mm for buses with only seated passengers
- Access—need for a door on the left hand side and the required dimensions for steps, and opening
- Head room—clearance inside the bus, 1800 mm for a large bus with frequent stops, 1650 mm for a coach. Smaller dimensions for smaller buses.
- Drivers guard rail
- External mirror to allow driver to view any rear doors
- Hand straps/rails/grips—suitable number to be fitted
- Floors
- Emergency exits—requirements for buses not meeting ADR 44/02
- Passenger seats—size and spacing of seats. Small differences for route service buses
- Driver's seat
- Passenger stop signals
- Interior fittings / materials
- Interior lighting
- Interior luggage racks—minimum clearance for seated passengers
- Tail shaft guards
- Fuel system—general principals for location of fuel tank and fuel system
- Fire extinguisher
- Dual tyres—need for dual wheels on rear axle
- Field of view—positioning of passenger seats not to obstruct the drivers field of view

ADR 59/00 **"Omnibus Rollover Strength"** applies to all buses, including route service buses built after 1 July 1993, except low floor height buses.

ADR 61/02 **Vehicle Marking** which specifies the requirements for vehicle marking ie. the position and details of the Vehicle Identification Number, Compliance Plate and Manufacturers Plate. 1 July 1992.

ADR 65/00 **Maximum Road Speed Limiting for Heavy Goods Vehicles and Heavy Omnibuses.** This ADR sets out the requirements for devices or systems to limit the maximum road speed of a heavy goods vehicle or heavy bus to 100kph. 1 July 1991.

ADR 68/00 **"Occupant Protection in Buses"** contains the requirement for seat belts, seat strength, seat anchorages, seat belt anchorages, child restraint anchorages, and impact attenuation characteristics of seat backs and arm rests.

- ADR 68/00 is applicable for:

  Buses with a GVM over 5 tonnes built since 1 July 1994

  Buses with a GVM over 3.5 tonnes built since 1 July 1995

- ADR 68/00 does not apply to:

  Route service buses; or

  Buses with less than 17 seats including the driver and crew; or

  Buses where all passengers seats have a reference height of less than one metre.

ADR 70/00 **Exhaust Emissions for Diesel Engine Vehicles** which reduces air pollution by limiting the hydrocarbons, carbon monoxide, oxides of nitrogen and particulates emitted from diesel engined vehicles. Route service buses built after 1 July 1996 must meet this ADR. Buses built after 1988 but prior to 1 July 1996 will be required to meet ADR 30/00 which also sets limits for reducing emissions but is not as stringent as the more recent ADR 70/00.

Design standards in other countries

The USA has a dedicated school bus fleet, with a range of safety standards introduced from 1978 (Austroads, 2001; Levy, 1985). These standards include

- a uniform colour
- roll-over strength
- emergency exit requirements
- strength of body panels and joints
- window strength
- mirrors to enhance visibility of passengers outside the bus
- padding and seat height designed to keep the passenger in the seat area during a crash (known as 'compartmentalisation')
- loud speaker systems
- boom gate crossing arms to stop children walking too close to the front of the bus
- stop arms to encourage traffic to stop when children are boarding and exiting a school bus.

The installation of seat belts in school buses has been mandated in four US states.

Canada has introduced a number of standards relating to school buses, including stop arms, red flashing lights, requiring traffic to stop when the bus is loading and unloading, and a comprehensive mirror arrangement (Austroads, 2001).

COMMUNITY INPUT: PUBLIC SUBMISSIONS AND CONSULTATION

prepared by:

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Centre for Accident Research and Road Safety – Queensland

Queensland University of Technology

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1 THE SUBMISSION PROCESS

In accordance with its terms of reference, the Task Force formally invited all individuals and organisations who had expressed concern to the Premier or the Minister for Transport and Minister for Main Roads regarding school transport safety within the past 12 months to provide a submission. The Task Force also invited submissions from key school transport safety stakeholders, including all Queensland schools, transport planners and policy-makers, and school bus operators and designers. In addition, a public call for submissions was advertised in major Queensland newspapers, *Education Views* and the QCPCA newsletter and broadcast on regional radio during April. Prior to submissions closing, print and broadcast media provided a forum for discussion and debate on core school transport safety issues, including seatbelts on school buses, which ensured the Task Force's role was widely publicised. The Task Force also set up a dedicated web page on the CARRS-Q website, which provides information about the Task Force and houses the *Overview of Research and Practice* and other facts about school transport safety in Queensland. The website also enabled lodgement of e-mail submissions. The official closing date for public submissions was 31 May 2001.

2 DEVELOPMENT OF A SUBMISSION DATABASE

2.1 Who provided submissions?

A record of the 185 submissions received was incorporated into a database maintained by the Task Force and it reflects the variety of stakeholders committed to the cause of school transport safety (*see Table 1*).

Table 1: Summary of submissions by community/stakeholder group

STAKEHOLDER GROUP	NUMBER OF SUBMISSIONS (n=185)
School Principals, Teachers and School Communities, School Authorities	75
Parents and Carers (General Community)	69
Drivers of Vehicles Carrying School Students (Bus Operators)	20
Transport Planners and Policy-Makers	13
Health Professionals	6
Students	2

The following individuals and organisations made written submissions to the Task Force:

Submission Number

1. Ms Robyn Corrigan, Poona Via Maryborough
2. Ms Sue Gibbs, Alice River
3. Mrs K. T. McCaw, Placid Hills Via Gatton
4. Mr Mark Hollands, Cairns
5. Chris Bannah, Kelvin Grove
6. Ms Rita Boustead, Mount Morgan
7. Mr Merv Tobin, Greenslopes
8. Mr Neil Jenkens, Amberley State School, Amberley
9. Ms Jane Olsen, address not supplied
10. Ms Maria Bocca, Cardwell Bus Committee, Cardwell
11. Mrs Natalie Van Der Wall, Samsonvale
12. B. J. Howden, Toowoomba Prepatory School, Toowoomba
13. Ms Sandra Vogler, Jimboomba
14. Mrs Cathie Willett, Glengallan Via Warwick
15. Ms Zena Ronnfeldt, Dalby
16. Ray and Joan Morrison, Gracemere
17. Mr Peter Young, West End
18. M. R. Sparkes, Nerang
19. Mr John Carr, Mossman
20. Mr Andrew Gray, Mt Isa
21. Ms Julie Attwood (MLA), Mt Ommaney
22. Mr Dean Tindale, Wurtulla
23. Ms Helen Hamilton, Sherwood
24. Mr Stuart Mason, Motorcycle Riders Association, Mt Gravatt
25. Ms Angela Thomson, Faculty of Health, QUT, Kelvin Grove
26. Mrs Glenda Hoelzl, Kuranda

Submission Number	
27.	Mr Clinton Booth, Nambour
28.	Mr Spence Grubb, Deception Bay
29.	Mr Billy Tait, James Cook University
30.	K. Mahoney, Mayor, Woocoo Shire Council, Maryborough
31.	Mr Jim Pearce, Member for Fitzroy, Gracemere
32.	Mrs Margaret Needer, Kallangur
33.	Mr Roland Kennedy, Caboolture
34.	Mr Julian Satoor, Sunnybank
35.	Mr John Thomas, Carmel College, Cleveland
36.	Mrs J. Grabs, Brandon
37.	Mrs M. Weidenhofer, Burpengary
38.	Mr Les Haines, Benowa Waters
39.	Brian and Wendy Maddocks, Mossman
40.	Mr Peter Hurley, St Ursula College
41.	Mr Michael Jacobson, Caloundra SHS P & C, Caloundra
42.	Ms Glenys Tonin, Julatten
43.	Ms Suzanne Sauer, President, Theebine State School P & C, Gunalda
44.	Mr Peter Needer, Kallangur
45.	Mr Rob Craig, Brisbane Boys College, Toowong
46.	Mr A. Krogh, Gunalda
47.	S. Nowak, Trebonne State School P & C, Ingham
48.	Dr R. L. Stable, Director General, Queensland Health, Brisbane
49.	Mr Neil Whittaker, Education Queensland, Brisbane
50.	Ms Barbara Shand, Aitkenvale State School P & C, Aitkenvale
51.	Mr Alan Hobson, Proserpine
52.	Mr Harry Elliott, Magnetic Island Bus Service, Nelly Bay Magnetic Is.
53.	Mr Colin Allen, St Teresa's Primary School, Ravenshoe
54.	Mr Wayne Smith, Bribie Island State School P & C, Bribie Island
55.	Mr Ross Collyer, Doonan
56.	Ms Karen Parsons, Givelda State School P&C, Givelda via Bundaberg
57.	Ms Suellen Coombe, Nerimbera State School P & C, Nerimbera
58.	Mr Steve Trevor, Regents Park State School P & C, Regents Park
59.	Ms Dixie Phillpot, Mossman
60.	Mr Michael Lamond, Douglas Shire Multipurpose Health Service, Mossman
61.	Mrs Michelle Boles, Kewarra State Special School P & C, Mackay
62.	Dr Brian King, Noosa Heads
63.	Mrs L. G. Kapper, Maryborough
64.	Mr John Hall, Glenwood
65.	Ms Dianne Ribot, Boyne Island
66.	Ms Gillian Pease, Eumundi State School P & C, Eumundi
67.	Anonymous
68.	Dr Vernon Hill, Figtree Pocket
69.	Ms Sandy Dalton, Central Queensland University, Rockhampton
70.	Ms Jenelle Wooley, Canossa Primary School P & F, Trebonne
71.	Ms Melissa Binney, Golden Beach P & C Association, Caloundra
72.	Ms Gayle Wharton, Rangewood
73.	Ms Anita Rolley, Balaclava State School P & C, Manunda
74.	J. B. Hichens, Warwick
75.	Ms Heather Mackay, Maidenvale SS P & C, Ayr

Submission Number	
75.	Ms Heather Mackay, Maidenvale SS P & C, Ayr
76.	R. Reiss, Kogan
77.	Ms Catherine Meehan, Woodstock SS Bus Conveyance Committee, Woodstock
78.	Ms Thea Mitchell, Beaudesert State Pre-School, Beaudesert
79.	Mr P. N. Joubert, University of Melbourne, Parkville
80.	Mr Alan Ward, Kynoch Coaches, Toowoomba
81.	Ms Tracey Christensen, President of Christ the King P & F Association, Deception Bay
82.	Mr D. J. Webster, Southbrook
83.	Ms Kelsey Burman, Toowong State School P & C, Toowong
84.	Mr Michael Kinnane, Director General, Emergency Services, Brisbane
85.	Ms Judy McAllister, East Ayr State Primary School P & C, Ayr
86.	A. Brendecke, Cow Bay
87.	Mr Athol Davis, Tara
88.	Mr Paul Dickie, Fed. of P & F Associations of Catholic Schools, Brisbane
89.	Ernie and Joan Comino, Tolga
90.	Ms Sonya Hodge, Warburg State School, Rosedale
91.	Mr Glen Mosch, Warwick
92.	Ms Janelle Costello, Beaudesert State High School P & C, Beaudesert
93.	Ms Julie Beck, Bluewater
94.	Mr Rob Davis, APLA, Strawberry Hills Sydney
95.	Mr Michael Paine, Beacon Hill
96.	Mr Clive Shield, Mt Lindsay Highway Bus Action Committee, Jimboomba
97.	J & D Kirk, address not supplied
98.	Mrs M. L. Girvan, Eatons Hill
99.	Ms Robyn Croft, Miami SHS P & C, Burleigh Heads
100.	Toni Austin, Aitkenvale
101.	Mr Steven Son, Alligator Creek
102.	Ms Mandy Wildeheart, Alligator Creek
103.	Mr Raoul Giudes, Queensland Law Society, Brisbane
104.	Mr Grant Fraser, Park Ridge State School, Park Ridge
105.	Ms Blanche Crisp, Willows State School, Thuringowa
106.	Dr John Roulston, Association of Independent Schools of Queensland, Spring Hill
107.	Mr Hughie Williams, Transport Workers' Union of Australia, Cannon Hill
108.	Ms Lesley Halloran, Jubilee Pocket
109.	Ms Lisa Mitchell, Eatons Hill State School, Albany Creek
110.	Ms Jan Patton, Pine Rivers State High School P & C, Strathpine
111.	Cale (Student), Currumbin Valley
112.	Mr Phil Welsh, South Kolan Transit, Bundaberg
113.	Mrs Lyndell Watter, Warner
114.	Mr Geoffrey Kent, Ingham State Primary School P & C Association, Ingham
115.	Mr Alan Trent, Dalby State School P & C, Dalby
116.	Mr M. K. Flinn, Maryborough
117.	Ms Alison Kelly, Pampas School Bus Conveyance Committee, Toowoomba
118.	Ms Savina Scheiwe, Collingwood Park
119.	Mr Daniel Black, Bellthorpe Road Safety Council, Bellthorpe
120.	Ms Barbara Marquant, address not supplied
121.	Ms Jessie Maher, Pimlico State High School P & C, Castletown, Hyde Park
122.	Ms Sylvia Cottier, Mt Louisa, Townsville

Submission Number	
123.	Ms Brenda Williamson, Thuringowa
124.	Ms Trish Morris, Torbanlea State School P & C, Torbanlea
125.	Lauris Gaffney, Mundingburra State School P & C, Hermit Park
126.	Mr Warren Pitt (MLA), Member for Mulgrave, Gordonvale
127.	Mr Andrew Bailey, Victoria Point
128.	Ms Anne Bicknell, Blacksnake/Cinnabah Bus Conveyance Committee, Kilkivan
129.	Mr Mike Wilkinson, Queensland Catholic Education Commission, Brisbane
130.	Ms Freda Deen, Gordonvale
131.	Ms Elizabeth Cole, Kelvin Grove Parents Group, Kelvin Grove
132.	Mrs Daphne Webster, Oakey State High School P & C, Oakey
133.	Ms Edna Goodwin, West Warwick Coaches, Warwick
134.	Mr Garry Cislowski, QCPCA, Albion
135.	Ms Tess Spencer, Chatsworth P & C Association, Chatsworth
136.	Ms Mary Strother, Alexandra Bay SS P & C, Mossman
137.	Ms Natalie Reiken, Karalee
138.	Mr Bill Cooper, Mackay
139.	Ms Janice Higgs, Anderleigh
140.	Lindsay Saunders, Eidsvold
141.	Mr Robert Cooke, Dakabin State High School, Dakabin
142.	Mr Gerrit Haaksma, Weir State School P & C, Thuringowa
143.	Ms Kim Bax, Beaudesert Bus Action Committee, Beaudesert
144.	Ms Jenny Sweeney, Caravonica State School
145.	Mr John Wessling, QCPCA Capricornia, Boyne Island
146.	Ms Christy Vena, Hermit Park, Townsville
147.	Ms Jessie Maher, Belgian Gardens State School P & C, Belgian Gardens
148.	D. A. MacDonald, Bundaberg City Council, Bundaberg
149.	Mr Jim Fahey, Ayr State High School P & C Association, Ayr
150.	Ms Loretta McGahon, St Patrick's School P & F, Bundaberg
151.	E. M. Mann, Hillgrove School Bus Run
152.	Mrs Jacqueline Tootell, Warrill View
153.	Ms Leigh-Anne Logan, Ramsey State School P & C, Cambooya
154.	Mr Graham Jenner, Mackay
155.	Ms Fiona Hughes, Mercy College, Mackay
156.	Mr Bede Mackenzie, Bellthorpe
157.	W. A. Bale, Mareeba
158.	Mr Alan Terry, RACQ, Brisbane
159.	Mrs Vivienne Bochow, Northern Branch QCPCA, Sunshine Coast Region
160.	Ms Terri Piper, Birkdale South State School P & C, Birkdale
161.	Mr Alan Goodridge, Taxi Council of Queensland, Stones Corner
162.	Ms Caroline Stemm, Oxley
163.	Ms Julie Mueller, Hillcrest
164.	Dr Shane Sondergeld, Australian Medical Association Queensland, Red Hill
165.	Mrs Brenda Sandr, Mt Garnett
166.	Mr Ian MacDonald, Bus Industry Confederation, North Parramatta
167.	Mr Terry Piper, Atherton
168.	Mr Miles Armstrong, Rocky Crossing State School P & C
169.	L. Davies, Mundingburra SS P & C, Hermit Park
170.	Ms Dorothy Hogan, Maroochydore SHS P & C, Maroochydore

Submission Number	
171.	Dr Fred Leditschke, CREST, Royal Children's Hospital, Brisbane
172.	Ms S Lepper, Alligator Creek via Mackay
173.	Miss Phoebe Lepper, (Student), Alligator Creek via Mackay
174.	Mr Terry Plant, Queensland Bus Industry Council, Mt Ommaney
175.	Mr Ian Herbert, Queensland Transport, Fortitude Valley
176.	Ms Katrina Abadour, Pacific Pines
177.	V. Zatschler, Eudlo State School P & C, Eudlo
178.	Dale Preston, Mundingburra State School P & C Association, Hermit Park
179.	Ms Rosemary Cox, Conondale SS P & C, Conondale
180.	Mr R. Hogan, Allingham
181.	C. Meehan, Woodstock State School Bus Conveyance Committee, Woodstock
182.	Mr Alan Ward, Kynoch Coaches, Toowoomba
183.	Ms K. Seudari, Ayr State High School
184.	R. McAllister, Belgian Gardens State School, Belgian Gardens
185.	Brisbane City Council

2.2 Where did submissions come from?

To provide further insight into the areas most concerned with school transport safety and urban- and rural-specific problems, the Task Force assigned each submission a Rural and Remote Areas (RaRA) classification (Cowan, 1997) based on the submission postcode. Despite accounting for only 51 per cent of the population, areas outside of the capital city lodged in excess of 70 per cent of the submissions received (see Table 2). This statistic, combined with many references to rural and remote road safety problems, suggests that the issue of school transport safety is of considerable concern to people living in regional and rural Queensland.

2.3 What were the submissions about?

The database contains a structured content analysis of each submission allowing the extraction of common school transport safety concerns in the Queensland context. Issues attracting the most attention in submissions included:

- Seatbelts on buses carrying school students (n=127)
- School bus routes and car driver behaviour within school zones (n=76)
- Standees, overcrowding and three-for-two seating (n=75)
- Student conduct on buses (n=22)
- Bus driver behaviour and management issues (n=20)
- Student pedestrian and cyclist safety (n=20)

Table 2: Summary of submissions by RaRA classification

RaRA CLASSIFICATION	PERCENTAGE OF POPULATION	PERCENTAGE OF SUBMISSIONS (n=185)
Capital city	48.81 per cent	29.73 per cent (55)
Other metropolitan centre [pop. > 100,000]	4.04 per cent	12.97 per cent (24)
Large rural centre [pop. 25,000–99,999]	12.39 per cent	11.89 per cent (22)
Small rural centre [pop. 10,000–24,999]	5.98 per cent	7.57 per cent (14)
Other rural area [pop. < 10,000]	25.04 per cent	28.65 per cent (53)
Remote centre [pop. > 5,000]	1.93 per cent	2.71 per cent (5)
Other remote area [pop. < 5,000]	1.81 per cent	2.16 per cent (4)
Not listed or interstate	–	4.32 per cent (8)

3 IN-DEPTH INTERVIEWS WITH AUTHORS OF SAMPLED SUBMISSIONS

Once common school bus and transport safety concerns were extracted from the database, the Task Force selected eight submissions to explore further through personal interviews. The organisations represented in this sample were varied, ranging from public and private schools to medical and legal professional bodies to a private bus company and bus action committee (*see Table 3*). In closed session interviews, the Task Force canvassed each organisation/ individual's stance on a broad spectrum of school transport safety issues. Interviewees were also given the opportunity to expand on their own submission and outline what they believed should be priorities to improve the safety of children travelling to and from school.

Table 3: Submissions sampled for in-depth interviews

Presenter	Organisation Represented
1. Mr Raoul Giudes (President)	Queensland Law Society
2. Mr Christopher Chappel (Bursar)	Christian Outreach College
3. Mr John Thomas (Assistant to the Principal: Religious Education; Bus Coordinator)	Carmel College
4. Mr Andrew Bailey (Manager of a Private Bus Company)	Andrew Bailey and Associates Pty Ltd
5 Ms Rosemary Cox (Representative of the Conondale SafeST Committee)	Conondale State School
6. Dr Bill Glasson (President) Dr Kerry Gallagher (CEO)	Australian Medical Association Queensland
7. Mr Rob Davis (National Vice-President)	Australian Plaintiff Lawyers Association Inc.
8. Ms Kim Bax/Ms Kim Limburg (Founders)	Beaudesert Bus Action Committee

An issues paper identifying key themes and priority areas discussed in the community submissions and consultations follows.

4 COMMUNITY SUBMISSIONS: ISSUES PAPER

The following content analysis identifies key issues and priority areas discussed in the submissions and extracts common school transport safety concerns in the Queensland context. Many of the submissions welcomed the Task Force concept, looking forward to the final report and "… practical outcomes that parents believe is so urgently required" (Pimlico State High School Parents and Citizens Association). All three submissions from the Mundingburra State School Parents and Citizens Association, in particular, indicated that they were alarmed by recent bus accidents involving school children and urged the Task Force "… to bring about the urgently needed changes to our bus travel laws".

4.1 Seatbelts on buses carrying school students

Seatbelts on school buses were the major issue discussed in submissions with nearly 70 per cent of all submissions (n=127) providing comment. Parents and carers, students, school communities and health professionals were virtually unanimous in their support for seatbelts on school buses (n=109). The primary argument was that all other road vehicles (including interstate buses) are fitted with seatbelts. Hence … "The children of Queensland deserve no less than safe, seatbelted, bus transport to and from school and on excursions" (Concerned Parent). The emotive nature of the issue was highlighted in a sobering thought provided by an eleven year-old student: "Some accidents … [without seatbelts] … could result in death, serious injury or maybe having to have a part of your body amputated. If seatbelts cost a few dollars, and a person's life is priceless, which do you think is more important? … The same basic rule applies for people standing in the aisles. If the bus suddenly stops, the people standing in the aisles all fall over, hurting themselves greatly". The Queensland Law Society justified their argument on "duty of care" grounds, suggesting that the Government's failure to mandate and install seatbelts on school buses is "… a clear breach of the United Nations Universal Declaration of Human Rights (1948)". Many of the submissions were quite scathing implying that there has been a "… gross lack of interest in the safety of children shown by the State Government to date" (Concerned Parent). Also, several of the submissions (eg APLA, Queensland Law Society, Belgian Gardens State School Parents and Citizens Association, Beaudesert Bus Action Committee, AMAQ) heavily cite a "Review of Truck and Bus Design in Relation to Road Safety" by Professor P.N. Joubert (1973) which shows an increased crash risk associated with a lack of restraints, three-for-two seating, and standees.

In contrast, bus operators and transport planners questioned the effectiveness of seatbelts because "… they may not properly fit all students and drivers will have to both supervise and adjust them" (Toowoomba Bus Company). In addition to the problem of determining who would be legally responsible for ensuring children wear the seatbelts, Kynoch Coaches Qld Pty Ltd cites "… retrofitting of seatbelts on buses older than 1994 (with no rollover strength) as costly and problematic". Furthermore, Kynoch Coaches Qld Pty Ltd points out that "… Surgeons Associations have not endorsed the use of lap-sash seatbelts for children under 12". The general consensus in submissions from operators is that it would be more beneficial for the Government to help subsidise a newer school bus fleet (with rollover strength) than seatbelts. On the issue of funding, there was agreeance among stakeholders that the cost of installing seatbelts would not be financially viable for a lot of operators and that "… Government funding should be provided immediately to upgrade bus safety" (Wheatvale State Primary School Bus Conveyancing Committee). As well as providing a large subsidy towards an improvement in bus quality and maintenance, the Beaudesert State High School Parents and Citizens Association "… strongly urges the Task Force to initiate a regulatory and/or non-regulatory code to govern these issues". This viewpoint reflects a common theme in submissions calling for the phased introduction and ongoing monitoring of formally established school bus safety standards.

4.2 Standees, overcrowding and three-for-two seating

Specific references in submissions to standees (n=45), overcrowding (n=19) and three-for-two seating (n=11) overlapped to a large degree with the issue of seatbelts on school buses. In many cases, respondents recommended that

adequate seating be provided for all students (ie. no standees) and the practice of three-for-two seating be abolished in preparation for the introduction of seatbelts. Once again, the research typically cited was a letter from Professor P.N. Joubert to the Bus Action Committee forecasting that "… a bus loaded with 103 children and 40 standees in a rollover accident would result in a 40-50 per cent death rate with a 90 per cent injury rate for survivors" (Beaudesert Bus Action Committee; Pimlico State High School Parents and Citizens Association). Not surprisingly many of the community and school submissions provided quite graphic scenarios and, in some cases, pictures of some highly dangerous situations in which school buses are severely overloaded. The Queensland Law Society attributes the dangerous longstanding practice of overcrowding to overly frugal State Governments and, like several other stakeholders, calls for a revamp of the way in which Governments subsidise school bus travel … "State Governments throughout Australia subsidise school bus travel and therefore benefit from a system which encourages the maximum number of students aboard a bus".

Unlike the introduction of seatbelts, bus operators and transport planners and policy-makers favour a review of current standee limits to reduce overcrowding. In fact, the Queensland Bus Industry Council Inc. indicated that "… it would be willing to embrace any initiatives to improve safety, but it must be clearly understood that appropriate funding would need to be provided … [and] … funding for vehicle replacement is the school bus safety priority". The overall feeling among bus operators is that the complete elimination of standees and three-for-two seating is impractical but they probably "… would support a rule allowing operators to carry only 10 per cent standees and a reduction in the speed limit from 100kph to 80kph on routes allowing standees" (Kynoch Coaches Qld Pty Ltd). The Queensland Bus Industry Council Inc also warns that the fare price is currently structured to carry standees which is legal and provides a safety net to cater for excess students if loading capacity is reached. So, if seatbelts were mandated and standees were outlawed, "… fares and vehicle income would have to be increased for operators" (Kynoch Coaches Qld Pty Ltd). In turn, this additional expense would have to be borne by Government and the consumer. The Task Force was heartened to read that, irrespective of the proposed countermeasure, most stakeholders and lobbyists recognise that there is no overnight solution and phased introduction of safer vehicles, equipment and practices appears to be the best course of action. For example, the APLA, who have campaigned for seatbelts on school buses for over a decade, call for: "Compliance with ADR68/00 (in conjunction with the elimination of three-for-two seating) to be progressively mandated for all Queensland school buses: buses on high-risk routes within three years; buses with low crashworthiness ratings within five years; and buses driven on roads exceeding 60kph within 10 years".

4.3 School bus routes and car driver behaviour within school zones

A substantial proportion of submissions expressed concern regarding school bus routes (n=45), the road environment around schools (n=19) and/or car driver behaviour within school zones (n=12). The primary safety criticism regarding school bus routes pertained to "… the state of country roads in many areas of regional Queensland including their lack of width and, in some instances, the poor state of road surfaces" (Queensland Catholic Education Commission). In response, several schools have requested "… policy which prioritises school bus routes in either the general maintenance or road resurfacing programs" (Rocky Crossing State School Parents and Citizens Committee). Furthermore, schools (eg Alexandra Bay State School Parents and Citizens Association, Conondale State School) expressed a need for increased bus route auditing in conjunction with Queensland Transport. Acknowledging the high cost of auditing and providing a safe statewide school transport service, schools and community groups seem more than happy for prioritisation of works based on "… special considerations that should apply to provision of services in high risk or mountainous areas, that should take into account the volume of traffic, the number of heavy vehicles on the route, the speed limit, and the number of people standing on the bus" (Mt Lindsay Bus Action Committee).

More than a dozen of the submissions specifically referred to problems with bus stops and set down and pick up areas. Andrew Bailey and Associates Inc., in particular, suggests that these areas are the most dangerous aspect of the school transport environment and "… design standards need to be formulated which include the size

of the stop, location from hazards, speed limits, lighting and signage". Consequently, the Northern Region of the QCPCA points out that "… all regulatory bodies including Local Government, Main Roads, Queensland Transport and Education Queensland need to plan a coordinated approach to achieve a safer resolution to this problem".

The unsafe nature of the road environment around schools is unfortunately exacerbated by the risky and illegal behaviour and severe lack of awareness of other drivers (Michael Paine and Dr Michael Henderson; Birkdale South State School Parents and Citizens Association; Andrew Bailey and Associates Inc.). The general consensus among community members and stakeholders is that car driver behaviour can only be modified by: increased enforcement of speed limits in school zones; clearly marked parking and non-parking areas; consistent lighting and signage on school buses; traffic calming; and a concerted education campaign to make motorists aware of the added danger in school zones and their responsibility when moving around buses. Finally, there appears to be strong faith in effectiveness of controlled crossings, with Dakabin State High School requesting that "… road crossings adjacent to both primary and secondary schools are to be manned by crossing supervisors or controlled by traffic lights".

4.4 Student conduct on buses

Twelve per cent of the submissions (n=22) addressed the issue of student conduct on buses. While there is support for Queensland Transport's current "Code of Conduct", several submissions believed that better partnerships and role clarification between QT, school administrators and police could enhance its effectiveness. For example, Park Ridge State School stressed that the "… enforcement of rules needs to be more frequent and transparent. The role of QT and police needs to be clearly defined". … "Education Queensland should place a high priority on school communities becoming familiar with the "Code of Conduct". This should be revisited on a regular basis by schools" (Conondale State School).

School communities, parents and bus drivers alike were of the opinion that the "… supervision of students should not be the responsibility of the driver" (Transport Workers' Union of Australia—Queensland Branch). "Bus drivers cannot be expected to do two jobs at the same time—ie driver and disciplinarian" (Conondale State School). In response to this problem, several submissions proposed the placement of monitors (older children/adults) and the installation of video cameras on problem runs (Chatsworth Parents and Citizens Association; Transport Workers' Union of Australia—Queensland Branch). Those respondents who believed that drivers should be responsible for managing student behaviour highlighted current training deficits. "Drivers have inadequate training and unclear reporting procedures for student behaviour problems" (Park Ridge State School). This issue is explored further under the following heading.

Carmel College proposed an innovative approach to the management of school transport that has the potential to minimise both loading and behavioural problems on school buses. The College "… has appointed a member of the Administration Team with specific responsibility for Bus Transport … [which involves] … liaising with the local bus company, parents and students". Carmel College is a partner in "… the process of determining bus routes" and often negotiates with the bus company on route to ensure loading restrictions are not exceeded. Any concerns drivers have about student behaviour are dealt with promptly in the school context. In such cases, "… the bus company and the school together enforce the Code" (Carmel College). Likewise, Conondale State School SafeST Committee (Queensland Road Safety Award Winner in 2000 and 2001) has an extremely active bus conveyancing committee and parent body that works closely with the local bus operator to regularly audit and determine safe routes, as well as to enforce the "Code of Conduct". Over the past few years, Conondale State School successfully lobbied Government to: build a safe bus turnaround area in an allotment adjacent to the school; upgrade the condition of local roads on school bus routes; and repair the infrastructure on the Grigor Bridge over the Mary River.

4.5 Bus driver behaviour and management issues

While many of the submissions commenting on bus driver behaviour (n=20) deal with specific drivers and routes, the Task Force did note a few commonalities. Some of the problematic experiences shared by respondents included: (a) leaving children behind or closing the doors before children

could get in; (b) overshooting stops resulting in children having to walk further around the traffic; and (c) a lack of procedures in place when students are missing from the bus (Concerned Parents). Andrew Bailey and Associates Inc. attributes these problems to the limited number of hours and poor working conditions associated with the job and "… as a result there is a high proportion of older drivers who receive a lack of training due to financial constraints on operators". Consequently, the submissions identify a need for better working conditions, education and training which will hopefully attract a higher standard of driver. Pimlico State High School Parents and Citizens Association even proposed the possibility of "… developing selection criteria for drivers including background checks to identify previous convictions for criminal matters, particularly those involving minors, and conducting regular medical health checks for drivers". Also, as the job involves daily contact with school children of a variety of ages, "… drivers should receive behaviour management training and children should be aware of the consequences of misbehaving" (Chatsworth Parents and Citizens Association).

The other key issue cited in submissions commenting on bus driver behaviour, particularly for rural and remote areas of Queensland, pertains to the lack of emergency response procedures (n=8). Therefore, the Mt Lindsay Bus Action Committee "… recommends that standardised emergency response procedures be developed and implemented …" throughout Queensland. Pimlico State High School Parents and Citizens Association also offers support for "… the development of bus safety awareness and a bus drill in all schools to include basic instruction for students [and drivers] on accidents and emergency procedures … [and] … for all designated school buses to carry a first-aid kit and for all drivers of these buses to hold a current first-aid certificate". The Department of Emergency Services endorse a formal emergency response plan and call for "… the logging of passenger numbers to ensure that all passengers are accounted for at the scene of an accident".

4.6 Student pedestrians and cyclists

Surprisingly, given their high levels of crash involvement, relatively few submissions dealt specifically with the safety of student cyclists (n=9) and pedestrians (n=11). Among those discussing cyclists, there was strong support for current bicycle helmet legislation and recognition of bicycle helmets as an effective safety countermeasure. However, there was a call for increased enforcement of bicycle helmet legislation, coupled with "…… publicity campaigns showing the dangers of not wearing a helmet" (Dakabin State High School). Helmet wearing could also be further encouraged by "… providing secure storage for safety helmets at all schools" (QCPCA). In terms of cyclist education, several submissions highlighted the need for Education Authorities and Queensland Transport to better utilise current resources (ie. Bike Ed and the Road Safety Council's cycling manual and video) and introduce "… school and community bicycle education courses with an on-road component to develop safe and responsible road use behaviour" (QCPCA). With regard to engineering solutions, the Task Force was encouraged to explore the feasibility of "… bike pathways … [being] … constructed on all feeder roads to schools" (Dakabin State High School) and "… the construction of bikeways separated from roads on school property and into school catchment areas" (QCPCA). The Christ the King School Parents and Friends Association also calls for existing bikepaths and footpaths around schools to be extended "… to prevent children walking and riding on the roads during congested times. This would increase both the accessibility and safety for children travelling to and from school".

Six per cent of submissions acknowledged genuine safety concerns about student pedestrians. In particular, the Queensland Branch of the Australian Medical Association (AMAQ) cited statistics from Monograph 26 (FORS, 1999) showing the high incidence of students being struck by vehicles after alighting from school buses. Accordingly, their organisation, like many schools, parents and Australian Plaintiff Lawyers' Association Inc., identified three broad strategies for reform: "(a) increased visibility of school buses; (b) traffic calming, or legislating that drivers must give way around school buses; and (c) public education". A holistic approach to community education (ie. educating students, parents and carers, bus operators, and other motorists) is a key theme reflected in the submissions. While it is extremely important to teach/show children how to safely cross the road and discourage them from crossing in front of the bus, it is equally important that road safety education emphasises that "… carers should not wait on the other side of the road for children" (Michael Paine and Dr Michael Henderson).

5 APPROACHING COLLEGE TRANSPORT ISSUES: A RESPONSE FROM CARMEL COLLEGE, THORNLANDS

Carmel College is situated in the Bayside suburb of Thornlands. The college is in its 9th year and has 760 students from Years 8 to 12. The college is a Coeducational Catholic College. It is located in Ziegenfusz Road and as such is not close to the Cleveland rail line.

Students attending Carmel come as pedestrians, dropped off by car, by rail to Cleveland Station and then bused to college, directly by bus, drive themselves or come with a student who drives to college. The largest proportion of students use the bus to come to college.

The college has addressed a number of issues to do with college transport over its nine years. In the initial design of the college the driveway was organised in such a manner as to permit buses and cars to come into the college property to drop off and collect students. This has meant that boarding and alighting buses, in particular, occurs largely on the college property and is relatively easily supervised by staff.

STAFFING ISSUES: The school has endeavoured to address transport issues in a number of ways over the last nine years. Since the beginning it has been the responsibility of a member of the College Administration Team to be directly responsible for Bus Transport issues. In the last five years, with the advent of Year 12 classes, another member of the College Administration Team has taken responsibility for issues related to student drivers. Currently, the practice is that the Assistant to the Principal: Religious Education is responsible for bus transport issues; the Assistant to the Principal: Administration is responsible for students who drive to and from school.

As part of the normal staff roster for playground supervisions the College has tried a number of initiatives. These have included: a variety of staff rostered on different afternoons; a reduced number of staff involved in the supervision of the buses in the afternoon; and currently, the members of the Admin do all the supervisions for the buses—this includes the Deputy Principal, APA, APRE. For the members of the Admin this is their playground supervision each day.

CAR TRANSPORT: Students are permitted to be dropped off by parents in the morning either in the two minute drop off zone at the front of the school or in the school yard in the designated areas. These designated areas are clearly marked and keep cars separated from buses that are dropping off students. In the afternoon parents are not permitted into the school yard until after the buses have finished loading students and have exited the yard. This is usually about 20 minutes after the end of the school day. There are only rare occasion when parents do not follow this procedure. When this occurs notices are put into the College Newsletter to remind parents of the College procedure in this regard. Generally, parents are very understanding of the safety issues with regard to buses. Students who are being collected in the afternoon do so from the footpath in front of the College. This is quite a wide area and students access cars from this area quite safely. A few years ago the College, in conjunction with the Redlands Shire Council, removed the school crossing from in front of the College. We were finding that the students simply stepped onto the crossing expecting that cars would automatically stop. With the removal of the School Crossing and the changes to accommodate the two Minute Drop Off Zone, students are much safer at the front of the school.

STUDENT DRIVERS: Once the school had developed into Year 12 students became old enough to drive to school. As the year progresses more and more students become student drivers. Whilst the College acknowledges that it cannot refuse students the right to drive to and from school, the College works in partnership with parents to ensure that safe practices are followed and that the College is adequately informed. Student Drivers and their parents are asked to sign a note that outlines the conditions that permit students to drive. These are:

1. No students (except for brothers and sisters) are to travel to or from the College with a student driver. In extreme circumstances, permission may be granted after a note has been received from the

parents of the driver and the parents of the passenger.

2. The vehicle is not to be brought into the grounds. Parking in the College grounds is for Staff and Visitors only.
3. The driver must hand the keys to the car into the office as soon as they arrive at the College and these cannot be collected before the dismissal bell in the afternoon.
4. The driver /or parent must contact the College if they will be absent or are going to be late.

The form also gets information about the vehicle that will be driven to and from the College. When there are concerns about student drivers or their passengers students are spoken to and the matter is addressed. If the concerns are serious parents or guardians are involved in the discussion. In the past, with the support of parents, student drivers who do not follow the procedures have been banned from driving to and from school. This can only be done with the support of the parents.

BUS TRANSPORT: The College has endeavoured to ensure that it works cooperatively with the local bus company. In this area we deal with only one bus company: National Bus Company, Capalaba. As the person responsible for Bus transport the APRE is known by the management at the bus company and by the drivers who regularly work the Carmel runs. This means that if there are concerns from the drivers they are able to approach the APRE during the afternoon playground supervision. Concerns raised by drivers are addressed in a number of ways depending upon the nature of the concern. It may be that someone speaks to the students in general once the bus is loaded; specific students may be spoken to about behaviours that are concerning; or Year 12 students are asked to keep an eye on what is happening on the bus. Year 12 students have been empowered to deal with simple issues on the buses or to report to staff at the College if younger students do not respond appropriately. Management at the bus company know that if they have concerns that these will be addressed by the College.

The bus company knows that it has the support of the College in managing student behaviour on the buses. Whatever actions are deemed necessary are taken by the College. These have included: bringing back a bus that was left in a mess for the students to clean during lunch time and enforcing the Department of Transport: Code of Behaviour for Travelling on School Buses. On this last point, a number of students have been spoken to by the bus company about their behaviour on the buses. To date, all of these have been done at the instigation of the College. Parents are informed by letter; the bus company are asked to send out a manager to speak to the student concerned. We have found that by responding quickly to concerns raised by the drivers and the bus company we have developed a very good working relationship. This has moved across into commercial concerns where the College has been able to negotiate about costs associated with hiring buses. The College uses the local bus company almost exclusively which brings weight to the negotiating table.

A good working relationship with the bus company where the company knows that its concerns will be quickly addressed have ensured that Carmel students have the safest possible means of bus transport. Drivers know the students and also know that they will be supported if they have concerns.

Where the students need to be transported outside the Redlands the College requests buses with seat belts. Where possible these are provided—only on rare occasions is the request not able to be accommodated. The bus company does not charge extra for these buses. As coaches are replaced by the company, coaches with seat belts are purchased.

The College also negotiates on the school routes that service the College. This has added another dimension to the working relationship between the two. Parental concerns can either be addressed to the bus company directly or through the APRE at the College who makes a decision about how to address the concerns raised.

CONCLUDING COMMENTS: The College has concerns about the safety of students travelling to and from school each day. In order to adequately address these concerns the College has put in place procedures that, hopefully, will make transport a safer issue. By using the Administration Team members as the key personnel in the administration of transport issues, the College acknowledges the seriousness with which it views the issues. Having the Administrators as the people responsible in this area means that student response to directions is expected. When younger staff are responsible for bus duty students tend not to respond as well to requests to modify behaviour.

RESEARCHER AND PRACTITIONER INPUT: EVIDENCE AND EXPERIENCES

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1 RESEARCHER AND PRACTITIONER INPUT

The review of current research, policy and practice in school transport safety (stage 1) and public submissions and consultation (stage 2) provided the Task Force with a sound understanding of the issues related to school transport safety ***(problem definition)***. This knowledge base was subsequently complemented by extensive researcher and practitioner input. In closed session interviews, the Task Force gathered informed comment from a broad cross-section of school transport safety researchers and key stakeholders, including road safety consultants, educators, health professionals and engineers. Details of the researchers and the evidence they presented can be seen in following sections. The researchers were thoroughly briefed and encouraged to pinpoint programs and strategies from other jurisdictions with the potential to improve school transport safety in Queensland ***(solution and strategy identification)***. In addition to commenting on the effectiveness of current school transport safety initiatives, the researchers answered a number of technical, logistical and legislative queries borne out of stages 1 and 2.

The Task Force interviewed bus operators, bus designers/manufacturers and other representatives of the bus industry from both rural and urban areas to gain practical insight into: (i) the age and composition of the Queensland school bus fleet [ie proportion of vehicles meeting roll-over strength and ADR requirements]; (ii) the financial and logistical feasibility of mandating seatbelts and reducing standees on school buses; (iii) student behaviour on and around buses; (iv) compliance levels with Queensland Transport's "Code of Conduct"; (v) problems associated with school bus route design; and (vi) driver behaviour in school zones and around buses. This valuable knowledge was balanced with bus management and engineering expertise provided by Queensland Transport representatives. Queensland Police Service officers and Department of Main Roads staff rounded off discussions with priorities for increasing safety in school zones and the surrounding environment.

2 PROFESSOR ROD TROUTBECK

2.1 Curriculum vitae

Professor Rod Troutbeck is Head of the School of Civil Engineering, Queensland University of Technology (QUT). With 30 years experience as a traffic engineer, Professor Troutbeck has expertise in road safety engineering research, including roadside infrastructure, performance of safety barriers, delineation, and the way in which drivers respond to the road design.

2.2 Evidence presented

Nature of bus crashes and the performance of roadside safety infrastructure

- Tabled report on roadside infrastructure, safety barriers and buses, looking at how the roadside can be made more forgiving if a bus leaves the road.
- "The performance of a safety barrier is a function of the structure of the bus". For example, trees of less than 150mm diameter will break for ordinary vehicles, however a bus can collide with a much larger tree and, due to the size and mass of the bus, the tree will still break. "There are few barriers in use that will redirect a bus, generally only those used on bridges. Most guardrails should be treated as it would have no effect on buses at all. … More than 95 per cent of crash barriers are not tested to a level to counter a bus collision". Barriers for heavy vehicles are most effective when they are flexible and keep the vehicle on the ground.
- Trucks and buses are protected by their mass in any crash. In the case of a crash, "… the acceleration and occupant velocity in buses is lower because of their mass, therefore occupant's impact is much lower [about half] and occupants are safer".
- Due to their high centre of gravity, buses have a high propensity to rollover, and therefore embankments pose a risk.

Road design and transport planning

- Roads should have sealed surfaces and provide opportunities for other vehicles to pass and overtake school buses. Safe re-emerging roadway sections should be provided at the end of overtaking facilities. More importantly, "… all road users should be given quality and consistent information about the road condition and advisory speed to match expectations with the actual road environment … [and] … any changes to the road environment should be made in a gradual fashion".
- Where possible, incompatible road users should be separated by constructing pick-up/set-down areas that separate the stopping bus from other traffic. "There is a need to address community attitudes about choosing bus stops for convenience rather than safety, as sites may not provide adequate separation of incompatible road users. … There also needs to be a mechanism by which the desired locations can be assessed for safety". A traffic engineer should be engaged in the design process of new schools to ensure that road users are appropriately separated. "It may need to be incorporated into the Integrated Planning Act".
- Recently released guidelines for the design of rural school bus routes and stops is a step in the right direction.

Signage, speed and visibility of buses in school zones

- "Signage is virtually ineffective, […] that doesn't mean to say you don't put up signs … [but] … appreciate that not everybody is going to read them". Research [Barry Cole, ARRB, 1980] "… showed that people only recorded a small number of the signs that they drove past, even when using running commentary to indicate what signs they saw".
- A further problem with signage is that drivers don't start slowing down until they see the sign which is often too late, especially for heavy vehicles that are more difficult to slow down.
- In preference to many signs cluttering up the road corridor, the road system should make drivers aware of potential hazards. " On the new roads the road system must be designed to provide cues to encourage motorists to slow down, including curves and changes in the road geometry".

- Flashing lights are a valuable tool for improving the visibility of a bus. “When the bus is at a stop, there are two separate aspects to its visibility. Not only do we need to make sure that it can be physically seen by other road users, it must also be very conspicuous to them. It has to be recognisable as a particular sort of bus, and the conspicuity is better with flashing lights, rather than stationary objects or stationary lights, because the human eye can so rapidly recognise and respond to movement”.
- “Fifty kph is the upper limit for survival” in a pedestrian crash. However, children can be severely injured at much lower speeds. Many crashes can be avoided by limiting speed which will give drivers more stopping distance, thus “… reducing differential speeds and traffic interaction”.

3 MR MICHAEL TZIOTIS

3.1 Curriculum vitae

Mr Michael Tziotis is a Principal Consulting Engineer for ARRB Transport Research, specialising in accident investigation and countermeasures, road and road environment safety, pedestrian and bicycle safety, speed and speed limits, traffic management, roadside hazards, safety audits and intelligent transport systems. Michael was part of the team that prepared the 2001 Austroads Report on School Transport Safety in Australia.

3.2 Evidence presented

Austroads (2001) Report—*School Bus Safety in Australia*

- The "School Bus Safety in Australia" project was initiated by the Australian Transport Council which asked Austroads to: (i) review current research and practices with respect to school bus safety; (ii) identify new and/or proven interventions; and (iii) develop draft recommendations for a *National School Bus Safety Action Plan.*
- ARRB Transport Research collected data on bus crashes from the Australian Transport Safety Bureau from 1992, 1994 and 1996. This data included information from coroners' inquests. As part of the project, ARRB also sought community views, and examined current initiatives.
- Child pedestrian and bus pedestrian fatalities and serious injuries were far more prevalent than bus-related casualties and usually occurred in the afternoon.
- Of the 24 bus related fatalities, 20 were pedestrians crossing the road to board or after alighting from the bus and only two were bus passengers. Almost all bus pedestrian fatalities occurred when the child had alighted from the bus. "These crashes involved mainly primary school children, mainly boys, mostly in the afternoon, and were on roads with speed limits of higher than 60kph. There was an even split between rural and urban locations. Most crashes occurred on undivided roads at mid block locations, and the child was unaccompanied".

Bus safety features

- The community's perception of risk is much higher than the actual risk. "The speed at which vehicles travel around school buses is a major element of risk".
- USA research from the Transport Research Bureau indicates that "… padding, higher-backed seats, better education of drivers and students, and better communication between drivers and students would enhance the safety of school buses. … Higher seat backs would be the most effective, reducing fatalities by 0–20 per cent". Current evidence supports padding as a safety measure, particularly on buses travelling longer distances.
- "Intuitively standees appear to be at greater risk". The issue of standees in high-speed zones should be addressed before looking at compartmentalisation and padding.
- There appears to be a problem with oncoming traffic seeing flashing lights on buses. ARRB recommended that the effectiveness of flashing lights be examined and cited a pressing "… need to publicise the purpose of flashing lights and make the public more aware".
- Emergency tracking procedures are required for buses travelling in rural and remote areas. "The national implementation of this initiative would cost approximately $1.8M".
- Rollover standards for buses were not addressed by the ARRB team.

Bus monitors and driver training

- Bus monitors were one of the least favoured safety initiatives by the Transport Research Bureau (USA). However, ARRB acknowledges their potential in Australia. "The role of school crossing supervisors could be expanded to address the behaviour of students at school bus stops". Community volunteers and "buddy systems" (where older students look after younger students) could be low-cost supervision alternatives.

- Increased enforcement of no standing zones, and parents calling their children across the road requires urgent attention.
- Consultation revealed that student behaviour on buses does distract drivers. Hence, behaviour management training for bus drivers is important. However, the onus of enforcement should not fall squarely on their shoulders. Police and education authorities are equally responsible. Training should also be prioritised. "There are two types of training: (i) training drivers in behaviours that will decrease the risk of children crossing incorrectly; and (ii) training drivers for behaviour management. Option one has more potential for decreasing crashes".
- When deciding on school transport safety priorities, it is important to adopt a risk- management approach and audit the current strategies/initiatives in place. "Austroads have recently completed a report on risk-management, and this could be considered in the context of bus route safety".

Data collection issues

- Many minor injury crashes or incidents are not reported so an accurate representation of the problem is not possible. "There are gaps in the data because of poor data collection procedures".
- If the police service focussed on school transport-related information and linked better to transport and health databases, data quality would improve.
- Difficulty in identifying which buses are actually school buses as there is no widely-accepted definition.

4 DR FRED LEDITSCHKE

4.1 Curriculum vitae

Dr Fred Leditschke is a retired Professor in Paediatric Surgery of the University of Queensland (1967–1998), and is currently the Senior Visiting Medical Officer, Burns Unit, Royal Children's Hospital. Dr Leditschke is a member of Kidsafe, and is currently Chairman of CREST (Child Restraint Education and Safe Transport Committee). CREST is a subcommittee of the College of Surgeons. It focuses on children's safety in motor vehicles, and includes manufacturers, Queensland Ambulance Service, the RACQ and Queensland Police Service. Dr Leditschke has been the President of the RACS Road Trauma Committee, and is currently the Commissioner of St John Ambulance.

4.2 Evidence presented

Seatbelt considerations and elimination of standees

- Supports seatbelts on *all* buses and trains. Children are required to wear seatbelts in cars so there should be no mixed education messages. "There are benefits in developing a life-long habit of "buckling up'". Behaviour change is more easily influenced by societal change as opposed to enforcement. "There is a need to put the infrastructure in place now, and then in several years the buses will move onto school bus routes".
- Seatbelts spread force in a crash and reduce ejection, particularly in lateral and rollover crashes. Lap belts are more appropriate unless there are adjusters of booster seats for lap-sash belts. "Lap belts prevent ejection, but allow flexion of the spinal cord (ie abdominal and spinal injuries). A lap-sash belt is safe if properly adjusted. However, an inappropriately adjusted lap-sash belt is more dangerous for children of 5–7 years (sits too high on the neck) than recoil lap-belts". There are issues with vandalism of lap belts that may be addressed by a recoil mechanism.
- Seatbelt designs and configurations should be undergoing computer-simulated crash testing, as opposed to dummy testing, which is not always applicable to the real world.
- Retrofitting is too expensive, and there will need to be a timetable for the introduction of belts. Starting point for seatbelts should be when schools are chartering buses for excursions.
- Fitting seatbelts to buses, like most health initiatives, appears not to be feasible from a cost-benefit perspective because of the low risk, "but from an emotive point it is".
- Standees are at greater risk. "In a crash, standees are likely to injure both themselves and those they collide with". Furthermore, "… standees are at greater risk if they are near the front of the bus or in exposed areas". The minor injuries incurred on buses by standees are often not recorded so the potential danger is very much underrepresented. There should be "… no standing in buses in rural areas".
- In terms of enforcement, "the driver is not currently responsible for ensuring children wear belts. It is likely the teachers union would not accept responsibility. Perhaps the parents need to accept responsibility. … There will always be a percentage who will not wear seat belts."

Other bus safety features

- Padding is also required. "There needs to be passive protection (ie padding) as well as active protection (seat belts)".
- Airbags are not suitable for small children because "… they are very large and have a fast inflation speed". Harnesses, on the other hand, are safer but there are still problems associated with adjustment.

First-aid training for students and bus drivers

- Supports first-aid training to be part of a broader school transport safety education program for both students and operators. "Bus operators should be trained in first-aid" and, as a member of public, will be legally protected if they assist injured persons after a crash. "They are covered to that level of competence to which they are trained, and they cannot be sued because what they are doing is basically commonsense". First-aid skills will need to be regularly updated.

Improved transport planning

- School environments need to be more friendly for student pedestrians and cyclists. The separation of the various modes of traffic might improve the situation. "Road design should allow buses to drive into the school grounds where possible".

5 PROFESSOR DREW RICHARDSON

5.1 Curriculum vitae

Professor Drew Richardson is the NRMA–ACT Road Safety Trust Associate Professor of Road Trauma and Emergency Medicine in the Canberra Clinical School of the University of Sydney. He became Director of the Emergency Department at the Canberra Hospital in November 1998, having been Director of Emergency Medicine at the Princess Alexandra Hospital in Brisbane for five years. Dr Richardson is a Graduate of the University of Tasmania, and a Fellow of the Australasian College for Emergency Medicine. His research interests include multiple trauma, emergency department systems, informatics and geriatric emergency medicine.

5.2 Evidence presented

Nature and likelihood of bus crashes

- "Bus crashes are dramatic events, and the media values lives lost in bus crashes more than in other crashes". Likewise, "…… the community values lives lost in mass transport more highly than others".
- The majority of school bus-related injury is to pedestrians moving around the vehicle with the child's behaviour and/or developmental limitations being a major causal factor.
- When a bus is involved in a crash it fares better than other vehicles. The impact in a bus crash is less than half that for a car. "Buses are large, slow vehicles and the "delta v' is slow and small, that is they don't slow down much in a crash".
- Standees are overrepresented in injuries and fatalities are much more likely to occur when the bus rolls over.

Effectiveness and appropriateness of seatbelts

- Seatbelts unquestionably provide protection in a rollover crash but "there are social and behavioural implications regarding seatbelts".
- Lap belts are a hazard if there is an aggressive surface in front of you and there is a higher incidence of spinal injuries associated with lap belts. "In an ideal world, there would be booster seats with lap-sash belts. Lap belts would help in a rollover crash, however they need to be installed in a padded environment to alleviate problems in a frontal crash".
- Seatbelts would save lives [about 20 per cent], but other measures would be more cost-effective. "Retrofitting is uneconomic, it would cost up to $500M per child's life saved". If fitting seatbelts, "… it is logical to start with rural and 100kph services".
- "There is a need to lower and enforce speed limits around buses, examine school site and road design, use warning lights, improve education on road and bus safety, and enforce occupancy rules, two-per-seat and no standees".
- "I'm a Professor of Road Trauma and I could never recommend anything but "Do it all!' All these things work: speed limits; school bus stop site design; warning lights; driver and child education; occupancy rules; and seatbelts."

Emergency procedures and trauma plans (disaster medicine)

- Generally, "there isn't enough skills around, particularly in paediatric trauma services" to deal with an emergency so "there is trade-off between low-risk high catastrophe, and high-risk low catastrophe events". A "national help network" (000 access in all buses) in conjunction with a nation-wide trauma retrieval system would be the ideal.
- Bus equipment, design and use of technology could greatly impinge upon health outcomes in the event of a bus crash. "For example, automatically activated satellite-linked crash notification systems for school bus crashes are expensive but you could easily justify the cost of this on a bus that was outside mobile phone range". There appears to be great potential for ITS initiatives and passenger manifests to ensure that entire bus loads can be accounted for in an emergency.
- Road environments on rural bus routes should also be accessible to emergency services.
- Trauma counselling "is seen as necessary and regarded as a standard of care … [but] … evidence of its effectiveness is limited at best. Long-term support and networking for accident victims is important".

6 MR MICHAEL GRIFFITHS

6.1 Curriculum vitae

Mr Michael Griffiths has a Bachelor of Mechanical Engineering and a Masters of Biomedical Engineering. Michael's expertise is in biomechanics of impact injury, tolerance of the human body to injury, vehicle safety, crash investigation, ergonomics and occupational safety and injury.

6.2 Evidence presented

Bus safety requirements and seatbelt considerations

- "Buses are by far the safest form of transport. … Urban bus crashes involving children are rare events. … Crossing to board and after leaving buses is the biggest area of risk, followed by getting caught in the doors".
- Standards in NSW relating to door-closing mechanisms have been introduced to avoid children being caught in doors. Better driver mirrors also complement these. Drivers should be encouraged to check mirrors before moving off.
- Seatbelts are "… a highly emotive issue but the numbers are insufficient to justify the costs involved. … The important thing to remember is that millions could be spent on initiatives that do not save any lives, or there could be initiatives such as behavioural change programs for parents which have the potential to save many. The media need to be given the real facts and real information from experts".
- Seatbelts could quickly be introduced on day trips and school excursions that are a different type of journey and represent greater risk. If they are introduced, certain requirements must be met. "The structure of a bus with seatbelts must not allow rollover intrusion. Laminated windows will prevent ejection. When introducing seatbelts in coaches, the state transport departments had to convince the federal transport department and the bus industry that change was necessary. Legislation change and enforcement were issues. Enforcement of seatbelts in buses has not occurred. Anecdotally, it has been suggested that 50 per cent of belts are not worn. There is a need for an effective enforcement campaign".
- Australian Design Rules are the best in the world. For example, coach seatbelts can withstand a 20g-force crash compared to UK belts meeting a 10g standard. For a minimal cost difference, "… the 20g standard protects the belted passenger, even if the passenger behind is unbelted. It would be safer to have no seatbelts than to have lap belts without the associated padding. Fitting lap belts is a positive degradation of safety. It is more important to have high-backed seats with energy absorbing padding and mountings that won't break away".
- Canadian research suggests that lap-sash belts are safer for young children (over 12 months).
- Rollover and padding (bringing the current fleet in line with ADRs) would greatly increase the safety of standees "… because rollover strength protects the intrusion space, and providing energy absorbing material on surfaces would benefit both seated and standing passengers".

Bus stops and zones around schools

- Pedestrian and bus pedestrian crashes are the most common type and have the most potential for change. "Children under 10 should be met at the bus stop on the same side of the road that the bus stops. This has potential to have the most effect on safety".
- All new schools should also have bus pick-up/set-down facilities and parents/guardians who drive children to and from school should be required to meet children at these stops. These stops should undergo regular safety audits in which the schools could participate. When children are forced to cross the road, "… it is safer for the child to cross the road when the bus is gone, as the bus is the major visual object".
- In theory, 40kph limits around buses and in school zones have merit but compliance is questionable. "Programs such as these need to be enforced to a high level to ensure a high rate of compliance. Without this there is a danger of fooling children into believing that they are in a safer situation, and that traffic will slow for them. Constant enforcement, such as the

use of a camera on the bus, would be required. However, as there is no dedicated school bus fleet in Australia, this would be difficult. … Lowering the speed limit gives motorists more time to see the child, but not if there are visibility issues (eg child is obscured by the bus)".

- If speed limits are reduced and enforced appropriately, then they should be associated with an overall drop in residential speed. "Speeds in residential areas are much higher than most other countries. Speeds need to be reduced in residential areas because children cross many roads on the way to school, not just in school zones". Also, a high proportion of injuries occur outside the direct vicinity of school zones.
- If school zones are to be time-based, then motorist attention needs to be drawn to the sign early (eg by flashing lights). Drivers are bombarded with road signs and often don't see them, subsequently compliance is effected.
- "Community acceptance, ownership and responsibility for school transport safety is the key ingredient in a Vision Zero approach". The target of zero fatalities associated with school transport safety is an achievable goal. However, improved safety for vulnerable roads users (eg cyclists and pedestrians) will only occur if speeds are lowered (30kph), enforcement levels are high, and community responsibility is increased.

7 MS MAUREEN FEGAN

7.1 Curriculum vitae

Ms Maureen Fegan is a Senior Lecturer at the Institute of Early Childhood, and Director of the Early Childhood Road Safety Education Program, which focuses on the implications for safety of children's development within the contexts of families and communities. Ms Fegan has been involved in Early Childhood Education since the early 1970's, including as the head of the Child Family and Society Strand at the Institute of Early Childhood, and the Inaugural President of CONTACT (federally funded program for isolated children and caregivers in NSW). The Early Childhood Road Safety Education Program is funded by the RTA in partnership with Macquarie University and is one of the RTA's School and Youth Programs.

7.2 Evidence presented

Ability of children to act appropriately on the road

- Children under 10 years of age are dependent road users and unable to consistently make safe road-crossing decisions, but they are often not aware of it. Parents and carers should be aware of developmental limitations and have a "duty of care" to protect children and explore the solutions available to them. "Independence and tenacity put children at risk in the road environment, but are nurtured and valued in other environments".
- "The best way to protect children crossing the road is to have an adult with them. … There is only six weeks between kindergarten (pre-school) and grade one, yet there is an assumption that in this period all children can safely move from 'hold my hand' to 'stop-look-listen-and think' before crossing the road".
- Children may rote learn how to cross the road in the same location each time, but when faced with a unusual situation do not know how to act. "Young children often focus on only one aspect of a situation, and can be easily distracted".
- Where possible, "… an adult should be picking up children aged 10 years and under on the same side of the road".

Community, parent and school partnerships to increase safety

- "Classroom education does not always generalise to the road environment" and should not be the only point of contact. Adults, from an early age (before 5yrs), should be actively supervising children in traffic, and can demonstrate safe road-crossing practices through strategies like "Commentary Walking'. "The emphasis is on starting early with children's services and teachers. … It is more than just being a safe role model, it is about talking with children about what you are doing when crossing the road". Modeling plus talking out actions over a long period under a variety of conditions (ie "ongoing and demonstrative"), with the adult accepting responsibility for the child's safety and constantly checking the child's understanding, is the key to safer pedestrian behaviour.
- Strategies for road safety education need to be localised and parental and school messages need to be congruent. Hence, "… there is a need to get teachers to work in partnership with families to hear what meaning children are currently taking away from lessons" and determine where there are gaps or inconsistencies. "There is a need to develop school materials in conjunction with teachers and parent bodies". Local community (intersectoral) discussion forums could facilitate this process.
- Initiatives such as a program run by the bus industry (ie places children in the driver's seat and demonstrates vision difficulties) have potential. It is important to involve the bus industry in road safety training. However, this training "… might shift the responsibility to the child … [and] … the corresponding adult vigilance becomes less because the kids have learnt about this at school". Overall, "there is a need to change community expectations of what a child is capable of doing".
- TAFE and university modules could be developed to equip future teachers and parents with the understanding, resources and skills to integrate road safety into the curriculum or "activity" model.

8 PROFESSOR JACK McLEAN

8.1 Curriculum vitae

Professor Jack McLean is a Professorial Research Fellow in Road Safety and Director of the Road Accident Research Unit at the University of Adelaide. An engineer with a doctorate in epidemiology and biostatistics from Harvard University, he is a Past President of the International Council on Alcohol, Drugs and Traffic Safety and a Board Member of the International Research Council on the Biomechanics of Impacts. He has been working on research into road accident prevention and injury control since the early 1960s.

8.2 Evidence presented

Risk associated with cycling and walking

- Supports the banning of primary school students cycling to school without supervision. "If one subscribes to the view that young children should be supervised when near a swimming pool, then people should supervise children on the road where the risk is every bit as great". This will cause problems for cycling advocates.
- Primary school-aged children lack the developmental capacity to consistently make safe decisions in traffic and this limitation is exacerbated by the complexity of the cycling task and the uncertainty of children.
- Queried current cycling helmet standards.
- Buses are comparatively safe and the introduction of seatbelts will inevitably lead to major compliance problems. Seatbelted buses could be used for excursions.

Speed reduction in school zones

- "The most potential for gains in road safety in general is in speed reduction and I would think that this would be very applicable to schools". Research clearly shows that reduced collision speeds (25-30kph) result in less frequent and severe crashes. Scandinavian countries are testimony to this.
- Optimal requirement would be 25kph (like in South Australia), but not only "when a child is present". Speed limit reductions in school zones need to be consistent and regular (eg all weekdays and/or all day). Stopping for buses in both directions might also be appropriate.
- Queensland's Speed Awareness Program combined with a concerted enforcement effort has great potential. [AWARENESS + ENFORCEMENT = KEY].
- Community change strategies require enforcement. "Thump people (enforcement) and attitudes catch up. Avoiding cognitive dissonance … forcing people to do a behaviour leads to a change in attitude".

Traffic calming and road design around schools

- "Road design should cue speed". Flags/ flashing lights might alert motorists to presence of speed reduction and children. More traffic lights would ensure that cars move in platoons, thus increasing safety (ie giving gaps in traffic). Arterial roads should also be signalised or have a raised median because many crashes do not occur directly in front of the school.
- In over 80kph zones, there is a need for supervised or pedestrian-activated signalised crossings.
- Cyclists should be encouraged to share dual pathways (safer than roads) and ride in the opposite direction for visibility purposes. There must also be increased enforcement of parked vehicles in school zones.

Student driver considerations

- American research suggests that the crash risk for student drivers increases with the number of adolescent passengers. "Student drivers should be prohibited from driving (and/or without passengers)".

9 EMERITUS PROFESSOR PETER JOUBERT

9.1 Curriculum vitae

Emeritus Professor Peter Joubert is a Senior Mechanical Engineer with the University of Melbourne and is a leading and longstanding researcher in the field of bus and coach safety. Professor Joubert's particular areas of expertise include seat strength and anchorage, the effectiveness of seatbelts on heavy vehicles, and optimising safety through improved vehicle and bus design.

9.2 Evidence presented

Seat strength, seat anchorages and belts

- While most major bus crashes to date have involved coaches, the Government has a duty of care to protect children. If there is a horrific accident and children are injured, the Government will be liable.
- There needs to be a phased but fairly quick introduction of buses meting rollover standard into the school transport fleet. This process should be complemented by the upgrading of seat strength and seat anchorages and the retrofitting of padding to all existing buses. "There needs to be strong, safe seats on buses operating in high speed areas and in mountainous terrain".
- Standees are at greater risk in a crash (contrary to the Henderson report) and should be banned in higher speed and higher risk areas. However, standees should still be permitted in urban areas.
- Once the issue of standees is managed, there can be a "… measured implementation of seatbelts in high risk areas … Seatbelts are not recommended in metro buses with low-backed seats".
- There are problems associated with carrying children in lap-sash belts designed for adults, such as the ADR68. Children are much safer in high-backed seats, even if they don't wear the seatbelts. Seatbelts are important for the front seats, the driver, and the centre rear seat. Compartmentalisation with high-backed strong seats are more important safety requirements, however seatbelts provide additional protection in a rollover crash.
- Seat strength standards between Europe (6.6g), America (10g) and Australia (20g) are varied and while 10g is good, it needs to be 20g for mountainous areas. "The National Road Transport Commission (NRTC) guidelines for the voluntary modification of existing buses and coaches recommend at least 10g". Even in urban route buses the seats should be firmly attached, so that they don't come loose in a crash (10g would be good).

Tyre retreads on buses

- Retreads should be banned on front steering tyres and full records should be kept for retread tyres. While some operators are not in a financial position to replace all tyres, most operators avoid using retreads where possible.
- The Queensland Bus Industry is addressing this issue and operators are well informed regarding tyre choice and safety.

Speed reduction in school zones

- The majority of bus-related crashes occur of the bus, so there is a need to "… lower speed limits in school zones".
- In order to change community attitudes and reduce speeds around schools, motorists need to be informed and given enough warning to slow down, and heavy enforcement will be required. Similarly, both the radio and print media need to be on side. "When the compulsory seatbelt campaign was introduced in Victoria, the newspapers took up the issue and compliance was increased". A reduction of speed limits in school zones would not be met with too much negative feedback because the Task Force would be trying to protect children.
- Traffic calming and speed bumps are not appropriate to reduce speed on main roads. Motorists need pre-warning, such as advance warning signs and flashing lights.

10 BUS MANUFACTURERS

MR CHRIS JONES, MR STEVE BUXTON, MR EVAN ISAACS AND MR DENIS McCONNELL

10.1 Experiences and evidence presented

Current situation

- Funding and the introduction of new buses was the primary issue for the bus industry in Queensland. The industry could be encouraged to upgrade the bus fleet if funding were available. "The average school bus age in Queensland is 20 years, and the technology in the vehicles is outdated". The Accessible Bus Scheme has introduced new low floor buses into the urban route fleet, and a similar scheme is required for school buses. "There is a pressing need for new buses with rollover strength".
- When buying new buses, operators need to be able to use them for a number of functions, not just for transporting children to and from school.

Potential to bolster the Queensland bus manufacturing industry

- The bus manufacturing industry in Queensland supplies 40 percent of Australia's school buses. It is currently capable of providing approximately 40 new buses a year, although the industry could be expanded to produce about 60 vehicles with sufficient notice to meet increased demand. At a cost of $1M per year to produce 40 buses, "… the entire Queensland school bus fleet could be replaced if a 20 year manufacturing plan was implemented".
- The manufacturers advised that it costs between $106,000—$110,000 for a bus body, and $90,000 for a chassis. "The standard spec requirement for a school bus would cost approximately $210,000 for a 57-seater". Air conditioning adds $30,000 and ADR 68 seats and belts add a further $20,000. If there was substantial growth and a long-term development plan for the Queensland bus manufacturing industry, there may be potential to export buses interstate and overseas to Asia and New Zealand.
- Some bus operators are choosing to install five-across seating in buses carrying primarily children. However, larger teenagers do not fit in this seating. There are other options for flexible seating. For example, wider seats (ie bench seating) would make it possible to sit six across with primary children.
- Over the last 8 years, most new buses have had padding installed, usually in the form of roll top seats. It costs approximately $1800 to pad metro seats and stanchions. "Foam-injected padding on all verticals in buses would be of benefit".

Fitting and retrofitting of seatbelts

- "Only buses built after 1994/95 (ADR68) have suitable anchorages in the floor to take seat belts". The cost of retrofitting appropriate seats and seat belts in these buses costs approximately $21,000 per bus ($346 per passenger). For buses without a suitably strong frame (pre mid-80's), there is also the cost of adding anchorages, bringing it to approximately $26,000 per bus (5 tonne). To install lap belts in older buses the seats must be replaced. "At a minimum, an operator would need to buy second hand coach seats, and then strengthen the bus frame and anchorages". It would be more economically viable to buy new seats and retractable lap-sash belts.
- Several Australian bus seat manufacturing companies are currently in the process of developing and testing three-for-two seating configurations with three child restraint anchor points. It is envisaged that the seat design will be certified to carry two adults or three children weighing less than 38kg each. The seat width per child will be about 300mm and a centre child harness and inertia lap will be fitted to the middle seat to provide restraints for all passengers.
- Older (pre-rollover) buses are weaker in structure and cannot be retrofitted to meet the rollover standard because it is part of the manufacturing process. "Fixing rollover and stress panels to older buses is not possible".

Addressing standees and student behaviour

- Standees should be eliminated in 100kph zones. Ideally, buses travelling in these zones should also have seatbelts and no three-for-two seating.
- Surveillance cameras cost only $3,000 to install on a bus and appear effective in monitoring and reducing student misconduct.

11 BUS OPERATORS

MR PAT NOLAN, MS JOAN COMINO, MR TERRY PLANT, MR JOHN CHRISTENSEN, MS CAROL NEILSON, MR KERRY PARONELLA

11.1 Experiences and evidence presented

Driver behaviour in school zones

- The panel of school bus operators were from country and urban environments, with both large and small fleets. There was a common consensus among bus operators that "… additional funding is required to upgrade the current school bus fleet to meet rollover strength and basic safety requirements".
- In addition, the general motoring community needs to be educated about driving safely around buses, and about the need to pick children up from the bus stop to ensure that they are not crossing roads unaccompanied. One bus operator estimated that "… only two percent of children were met by adults at the bus stop".
- Motorists appear to lack awareness and recognition of the dangers of speeding around school buses and the likelihood of children being on or near the roadway. "There needs to be respect for the bus shown by motorists … [and] … enforcement has the potential to restore this respect". Anecdotally, the 40kph speed limit in NSW is ineffective and police have advised that it is not being enforced. In many cases, it is not possible for drivers to slow down from 100kph to 40kph.

Bus route design and school zones

- "In some circumstances, local councils cooperate with bus operators regarding the location of stops, however this does not occur regularly". In urban areas, the route network for school services is different to passenger services, therefore the bus stops are located differently. It is also sometimes difficult to motivate Conveyance Committees to meet regularly unless there are issues with a particular route.
- Well-designed pick-up/set-down areas can provide parent parking to ensure that this does not interfere with the movement of the bus. "Sufficient space for the bus to stop clear of the road way, and to merge back into the traffic—an acceleration zone—is required".
- Another major problem is that "… parents often request that buses stop near their houses, however this is not always the safest location". There needs to be tradeoff between convenience and safety.
- There needs to be a system whereby local governments contact bus operators when road upgrades are being scheduled. Likewise, there is a responsibility for bus operators to approach the council when upgrades are going on to ensure that transport planning decisions are informed by both safety and practicality considerations.

Student behaviour on and around buses

- Most bus pedestrian crashes occur in the afternoon when children are more distracted and pay less attention to the road. Children appear more docile in the morning than in the afternoon.
- "Where there is a positive relationship between the bus operator and the schools, with a good behaviour management program in place, there are less problems with student behaviour".
- The operators were concerned about the potential impacts of banning standees including what to do with the child left standing on the side of the road. Loads are currently projected on the basis of full seating, with standee capacity used to manage fluctuations.
- There are problems with getting children to wear seatbelts correctly in belted buses "… and some children extend the belts to their limit so that they are loose around them". One operator advised that his school service includes a few buses with lap-sash belts. "Initially, the wearing rate was 5 per cent. However, this raised to

over 50 per cent during an education campaign involving schools and parents. The rate dropped when the campaign finished". Vandalism is a serious issue, but the occurrence depends on the type of community.

- Buses with high-backed seats have the highest incidence of vandalism, as drivers cannot see children towards the back of the bus. Even just padding metro seats has effected visibility and had a negative impact on child behaviour. Video cameras, either dummy or real, were suggested as an option to address these behaviour issues. An adult monitor on each bus may help. However, it is already difficult getting drivers who can handle children appropriately, so it would be hard to find suitable monitors. "On some excursions, school teachers even seem to believe that the behaviour of the children is the responsibility of the driver".
- There is strong support for the current "Code of Conduct" and the implementation of a bus behaviour course or induction for parents could greatly improve road safety, community awareness and student behaviour on buses.

Funding and fleet upgrades

- A new school bus costs about $250,000 and operators simply cannot afford to pay this much for a bus that will be solely used for school services. Additional charter is required to ensure the viability of the service. "Operators with larger fleets use their new vehicles on charter runs, and use the older buses on the school runs".
- Current flashing and wig-wag lights on buses are not particularly effective in reducing motorist speed. However, "flashing lights might be effective at identifying school buses if there was an ongoing media campaign advising motorists of the purpose of the lights". In contrast, a uniform colour for school buses would have a significant negative effect on the charter market. Also, it appears that some children use the bus appearance to remember which bus they are required to catch.

Bus driver training issues

- There are immense difficulties in finding and training drivers in the management of child behaviour, especially given that the primary purpose of the driver is to drive safely. "The 15–20 hours per week employment that can be offered to drivers greatly restricts the employment pool and the quality of driver on school services". Due to the already fragile relationship between bus drivers and children, any change, such as a change in driver, can have a negative impact on behaviour.
- "Drivers must have a criminal history check under Driver Authorisation requirements".

12 BUS MANAGEMENT

MR IAN HERBERT AND MR TERRY CLARK, QUEENSLAND TRANSPORT

12.1 Experiences and evidence presented

Government funding for school transport users

- Queensland Transport administers the School Transport Assistance Scheme (STAS) which bridges both Education Queensland and Queensland Transport. The Scheme is distance, income or disability-based, and includes all general modes of transport (bus, ferry, car, rail). In 2000/01 there were 139 100 recipients of STAS, costing the Government $107M. In terms of school bus travel, there are also fare-paying passengers travelling on buses, school owned buses, charter buses, and incidental students on urban commuter services.
- The aim of Queensland Transport over the last few years has been to make the fares-based and kilometric subsidy systems fair and equitable. "Any changes to the current system involving extra expenditure will need to be approved by Treasury and, in Queensland, there is an increasing population that is very dynamic. The rural downturn is seeing the closure of many services".

Age of the Queensland school bus fleet

- The age of the bus fleet is an issue from a strategic point of view. "The fleet is at a cross-roads, with the drip-feed of urban buses into the school fleet drying up. This is compounded by the purchase of mini-buses and low floor buses by urban fleet managers. The biggest issue in school transport is the supply of buses".

Difficulties in reducing standees

- The majority of standees were being carried in South-East Region which is constantly growing. "The capacity to carry standees is required to maintain flexibility". Also, when buses are only travelling short distances (ie in urban areas) the fares are low, and operators need to be able to carry standees maintain viability. "The majority of child standees in Queensland (1700) are travelling in areas of 60 kph or less. Approximately 900 are travelling in speed zones of 60–80 kph".
- It is estimated that between 30,000–50,000 children are travelling to and from school on buses without receiving STAS from the Government. The majority of rural routes are funded by government, but the fringe areas are different, and loads vary widely on buses with cash fares. "Bus operators have advised that they match the number of seats with the STAS children, and cash fares are the standees".
- A trial of managing standee loads at Beaudesert by the re-routing of buses and addition of extra buses resulted in enough seats across the fleet for all passengers, but standees were not eliminated on all routes. By way of example, to ban standees in some cases, a seven-bus fleet would need to become a 12-bus fleet to manage the extra loads. "The standee regulation would need to be changed if seatbelted buses were introduced into the fleet, and flexible seating arrangements (such as five across seats)". However, five across seating does not seat adults comfortably, and as such would not work on urban routes such as with Brisbane Transport. "The costs of upgrading the fleet include government costs such as higher STAS and more subsidy for urban operators, and higher costs for the public, including higher cash fares, and higher charter costs".
- It has been noted that the quality of second-hand buses has lowered each year. "The highest priority at the moment is the upgrading of the existing fleet".

13 BUS ENGINEERING

MR HENRY SCHLEIMER, QUEENSLAND TRANSPORT

13.1 Experiences and evidence presented

Australian Design Rules applicable to buses

- Australian Design Rules have been around for the last 30 years and numbers 44, 58, 59, 66 and 68 are applicable to buses.

> ADR 44 and 58—Availability of standardised emergency exits (1988). Prior to this, buses met similar standards under State regulations, and therefore all buses on the road meet this standard.
>
> ADR 59—Rollover strength (1992). Based on the European standard that specifies maximum intrusion of bus structure. It is unknown whether buses built prior to this would meet this standard. Ultra low floor route service buses (less than 550mm above the ground) are exempt from this requirement, as crash history showed that they weren't involved in rollover crashes. However, some manufacturers should still be using rollover strength bodies on ultra low floor buses.
>
> ADR 66—Coach seats tested to 10g crash pulse.
>
> ADR 68—Coach seats and seatbelts tested to 20g crash pulse [what a normal car seat is designed for] (1994). Seats and belts are tested using instrumented dummies in seat belts (head, chest and knee injury recording), with non-restrained dummies in the seats behind.

Seatbelt and rollover requirements

- There is a voluntary Code of Practice for improving occupant protection in buses, which includes emergency exits, padding, seat belts (lap and lap-sash). The code allows the fitting of seat belts to buses without rollover strength, stating that the belts provide protection in the majority of crashes that aren't rollovers. Compliance with the voluntary code is required under the *Transport Operations (Road Use Management—Vehicle Safety and Standards) Regulations 1999*. Under these regulations, it is an offence to modify a vehicle without approval from Queensland Transport, and specifically, from an approved engineer. All buses in Queensland are inspected every six months and non-complying belts or seats are be picked up during this inspection. In older buses, the structure must be thoroughly inspected before fitting belts. Additional structural modifications may be required.
- Lap belts should not be fitted to buses with low backed seats as there is a serious risk of head injury from hitting the seat in front.

Crash testing and standees

- In the UK, the crash pulse standard for seats and belts in buses is lower (10g), therefore not much structural modification is required to retrofit. A seat and belt tested to 10g will provide protection in many crashes, but does not provide as much as a car.
- ADR66 (with a 10g crash pulse seat) is roughly equivalent to the compartmentalisation principle used on school buses in the USA. In Australia ADR68 exceeds this and provides a higher level of protection.
- In a frontal collision between a bus and a car, the heavier vehicle will experience less deceleration, and therefore injury to passengers is less. However, in the case of a bus hitting a vehicle of the same size this does not apply. US and Australian research using cars and utilities showed that the heavier the opposing vehicle the more damage to the occupants of the lighter vehicle. In most cases, a person travelling in a bus is unlikely to experience a high deceleration load in a crash.
- With standees, there is nothing to stop the standee at the head of the aisle travelling forward and through the windscreen in a serious crash. However, because they are travelling in a heavy vehicle the deceleration is likely to be low. There was an example at Tenterfield in the mid 1990's where a standee, the only passenger not in a seat with a seat belt, was the only bus passenger killed in the crash. In route buses, standee injuries are low because of the predominantly low speeds that they travel at. Under the *Transport Operations (Passenger Transport) Standard 2000* standees cannot be carried on long distance or tourist buses. Furthermore, buses carrying standees must be designed for that purpose, there is a 20km limit for which standees can be carried and are banned

from certain mountainous areas. A hand-grip must be provided for each standee, and must be able to be reached by a five year old (ie hanging straps are not counted). The number of hand-holds counted for each stanchion is limited by the number of people that can comfortably stand and grip the stanchion.

Retrofitting and bus specifications

- Retrofitting padding in buses costs approximately $30 per seat ($1500 per bus). It is an effective way of reducing minor injuries in the most frequent crashes. In the UK, padding is required in those buses that have lap belts. Queensland's padding standard was introduced in 1997 and was made retrospective for regional buses (travelling up to 350 km) less than 20 years old, and all buses introduced into Queensland after that date. Many local classification (route service) buses are not required to have padding. Extending the padding requirements to these buses may improve safety.
- In October 1999, Queensland introduced the new national standard for warning lights and signs. The lights are a lot brighter than the previous standard. The lights wig wag and are as bright as fog lights. The lights cost approximately $450 per bus plus installation costs. Lights and signs are currently only required on those buses used exclusively for the carriage of school children. This definition has caused problems, as those buses that occasionally carry adults or are used for charter are not required to have flashing lights and signs.
- There are some buses that are exempt from the requirements of the Type, Age and Use Policy (ie bus classifications, age limits etc). For example, if a bus is owned by a school/organisation and they do not charge a fee for school services or other services then they are exempt. This means that "… in these instances a route service bus may be used for long distance trips, it has no age limit, it requires no flashing lights and signs, and does not need to be inspected every six months". In essence, it is treated as a private vehicle.

14 ENFORCEMENT

SUPERINTENDENT GRANT PITMAN AND SERGEANT JOHN RULLER, QUEENSLAND POLICE SERVICE

14.1 Experiences and evidence presented

Complaints and offence data

- There were 41 complaints relating to school buses, and 28 complaints in relation to driving behaviour at school crossings recorded in the Queensland Police Service Traffic Complaints system between 1 July 2000 and 30 June 2001.
- During the year 2000 there were 5712 speeding tickets issued to motorists exceeding the 40kph school zone speed limit. "Operation Back To School 2001" resulted in:
  - 2217 officer hours of enforcement
  - 1327 speeding offences detected
  - 227 seat belt offences detected
  - 325 bicycle offences detected
  - 22 pedestrian offences detected
  - 336 parking offences detected
  - *745 other traffic offences detected*

Seatbelts on buses

- A workshop was conducted in the 1990's examining the Mt Tamborine and Boondall bus crashes to determine what the outcome would have been had the buses met current seat strength, seatbelt and rollover ADR requirements. This examination suggested that new buses with lap belts would have saved up to 40 per cent of lives at Mt Tamborine, and lap-sash belts would have saved up to 80 per cent of lives.
- Queensland Police are currently working with Queensland Transport to examine why young adults are not wearing seat belts. There are issues with peer group pressure in the car environment, and truancy. Anecdotally, there are a number of young people dying in car crashes who were truants at the time. Often drugs, alcohol and speed are involved. In addition, QPS are concerned that student drivers with adolescent passengers are at greater risk of being involved in a crash.
- Queensland Police are aware that buses are the safest form of road transport, but there are several Police officers who are also presidents of their P & C Association, and have publicly made comments associated with the issue of seat belts on buses. The Police Union has also taken a stance on the issue of seat belts on buses and, in many cases, "… police comment on the importance of seatbelt wearing at the scene of the crash to reinforce the use of seat belts in vehicles across the board".

Enforcement in school zones

- Speed cameras are impractical in 40kph school zones, and it would also be almost impossible to enforce speed limits around school buses. "There are not enough police resources to undertake enforcement at schools each day".
- Traffic calming measures and efforts to match the environment to the desired speed would be more effective in modifying driver behaviour than increased enforcement.

15 TRAFFIC ENGINEERING

MR JON DOUGLAS AND MR GORDON LEE, DEPARTMENT OF MAIN ROADS

15.1 Experiences and evidence presented

Speed limits for buses

- In the early 80's, there was a national differential speed limit (eg 80km/hr in a 100 km/hr general speed zone) for heavy vehicles which was later removed because it was causing crashes. Creating differential speed results in greater potential for crashes and this became an issue of debate when the states were moving to national road rules. A regulatory impact statement was prepared on the issue. A crash benefit for reducing the speed of heavy vehicles could not be demonstrated, and it was determined that it would be likely to increase unsafe overtaking manoeuvres.

School zones and associated speed limit

- At schools, if there is a dedicated school bus pick-up/set-down area, cars should not be allowed into this area. "Separation of road users is always best". At existing schools with a single road frontage there are problems providing facilities meeting this criteria. To avoid locating a bus stop at a location with a history of crashes eg run-off the road, the crash history of the site should be checked.
- The challenge with school zones and school zone warning signs is that they don't affect behaviour unless the motorist encounters the hazard (ie school children in the road environment) at some stage. "The lower speed limit needs to be associated with the risk or presence of children for shorter periods of time …… Signs need to match risk and road environment cues". If this is infrequent, the credibility of a sign is diminished, as is compliance. Schools have put pressure on for longer school zone hours, however this has been shown to be ineffective in maintaining speed reductions.
- All day school zones are not likely to be effective. The reinforcement from the regular encountering of the hazard (ie children present in the road environment) is what ensures compliance. Physical devices for reducing speed are the most effective, however as school zones do not operate all day this is not a practical solution.
- Road engineers contend that further dropping the speed limit in school zones is unlikely to result in good compliance, as it would be trying to encourage a behaviour that is not reasonable given the road environment. "Dropping the speed limits by more than 20km/hr on any road to cater for school zones would create a false sense of security for the school community as good compliance with such speed limits could not reasonably be expected".

Traffic calming and bus route design

- There are a number of problems at schools caused by parents themselves (eg parking in bus stops, double parking etc). Kerb extensions and pedestrian refuge islands can increase safety at schools by reducing the distance to cross, providing a place where the child can stand and wait and be seen by approaching traffic, and encouraging traffic to slow down.
- The new Guidelines for the safety management of Rural School Bus Routes and Bus Stops should address a number of the concerns raised regarding the safety of bus routes. Specific guidelines pertain to: visibility and stopping distances; road geometry; steepness; pick-up/set-down areas; pavement condition; intersections; auxiliary lanes; crash barriers; width of shoulders and school bus performance.
- Safety reviews at schools have been happening for years to some extent, however a formalised process is needed. Individual schools should be encouraged to conduct reviews under the auspices of the SafeST checklist and liaise with Queensland Transport to identify unsafe routes and take appropriate action.