

**Title:** A method for evaluating the 40 km/h initiative around school buses in NSW

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**Abstract:**

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**Introduction:**

It is often the case that new road safety programs and initiatives are introduced without a detailed understanding of their true impact on road safety. To assist road safety professionals in determining the benefits of introducing various road safety programs it is vital to conduct an evaluation of the overall effects, for example changes in community attitudes, driver behaviour and crash occurrence.

Part of the evaluation process is determining an appropriate framework, scope and set of performance measures to determine the possible impact on road safety. This paper presents the method adopted by ARRB Transport Research (ARRB TR) to evaluate the 40 km/h speed limit around school buses in NSW. It should be noted that the results of the evaluation are not presented in this paper.

**Background to the evaluation**

The Roads & Traffic Authority commissioned ARRB Transport Research in August 2000 to evaluate the 40 km/h initiative around school buses. The initiative was introduced in January 1999 with the intention of increasing the safety of school children around school buses.

There were a number of events leading up to the implementation of the initiative. These events have been summarised chronologically in this section.

In 1994, Staysafe recommended, as a principal recommendation concerning the road environment, that “a 40 km/h speed restriction on motorists nearing a school bus when the flashing lights are activated” (Staysafe 26). Staysafe suggested that the recommended 40 km/h limit was based on early work done in 1970’s by the Traffic Accident Research Unit (TARU) – where 40 km/h was documented as an appropriate speed for approaching vehicles and for vehicles travelling in the opposing direction.

Staysafe suggested that a 40 km/h speed restriction complemented the existing 40 km/h school zones, extending the speed reduction of passing motorists to other locations where children are present. The 40 km/h school zones were introduced in New South Wales in the early 1990’s to reduce the speed of traffic around schools on non-arterial roads and were later endorsed by the Australian Transport Advisory Council in 1994 – making it national policy. The Australian Transport Advisory Council further advised that for arterial or non-urban roads the speed limit around schools should be set at an appropriate level to provide for the safety for children travelling to school. However, at a Regulation Review Committee meeting held in May 2000, it was noted that a specific lower speed limit for higher speed, non-urban roads had not been set.

A trial of the 40 km/h speed restriction for travel around school buses, commenced in Newcastle in September 1997, and ran, in conjunction with the school terms, until April 1998. A trial was simultaneously undertaken in the Lake Macquarie local government authority.

The trial included 20 specially equipped buses, fitted with black and yellow warning systems and flashing lights mounted on the bus. These buses serviced 40 schools in the area. The trial was accompanied by a comprehensive publicity campaign (radio, press and signage) and enforcement (highly visible police patrols).

Evaluation of the trial found considerable support from drivers in the trial area for the initiative as a suitable means of improving safety (RTA 1998). Observations and speed measurements conducted along school bus routes, as part of the evaluation, indicated that drivers in the trial area were likely to slow down, but they rarely slowed to the 40 km/h speed limit. The evaluation suggested that the results were similar to that found for a trial of 40 km/h School Zones in the early 1990s (RTA 1998). This trial for school zones showed small initial reductions in motorist speed, yet over the following five years, anecdotal observations of drivers, indicated that compliance with the school zone speeds had improved with continued enforcement and education.

The 40 km/h school bus initiative trial also revealed some unpredictable driver behaviour associated with drivers slowing down in high speed areas when confronted with a stationary school bus. For example, drivers reported difficulties in slowing to 40 km/h for a stopping bus when travelling on a rural road, limited at 100 km/h. This has raised questions about the applicability of the 40 km/h bus initiative to multi-lane, high speed roads, hence the development of Bus Stop Blackspot zones.

Despite these concerns, the evaluation recommended that, under certain conditions, the initiative should be implemented statewide to improve the safety of child pedestrians. In August 1998, the initiative was announced in NSW.

Figure 1 presents a time line of events surrounding the implementation of the 40 km/h speed limit initiative.

Buses involved in the initiative were fitted with a 40 km/h speed limit sign and flashing lights on the rear of the bus. When activated the lights indicate to approaching drivers that a 40 km/h speed limit is applicable. Drivers in the opposite direction are warned of the presence of a school bus by flashing headlights, however there is no requirement for these drivers to slow to 40 km/h. The initiative also included the use of bus stop blackspot zones on rural roads zoned 80 km/h or higher where there is no provision for pedestrians to cross the road. The blackspot zones are identified by a series of signs indicating drivers should slow to 40 km/h if a bus with flashing lights is the road ahead. However, their use has been limited to five sites in Sydney and four sites in Newcastle.

Figures 2-5 depict the different arrangements of the 40 km/h speed limit sign and the flashing lights adopted by the bus companies. Some of the buses also show advertising on the rear of the bus.

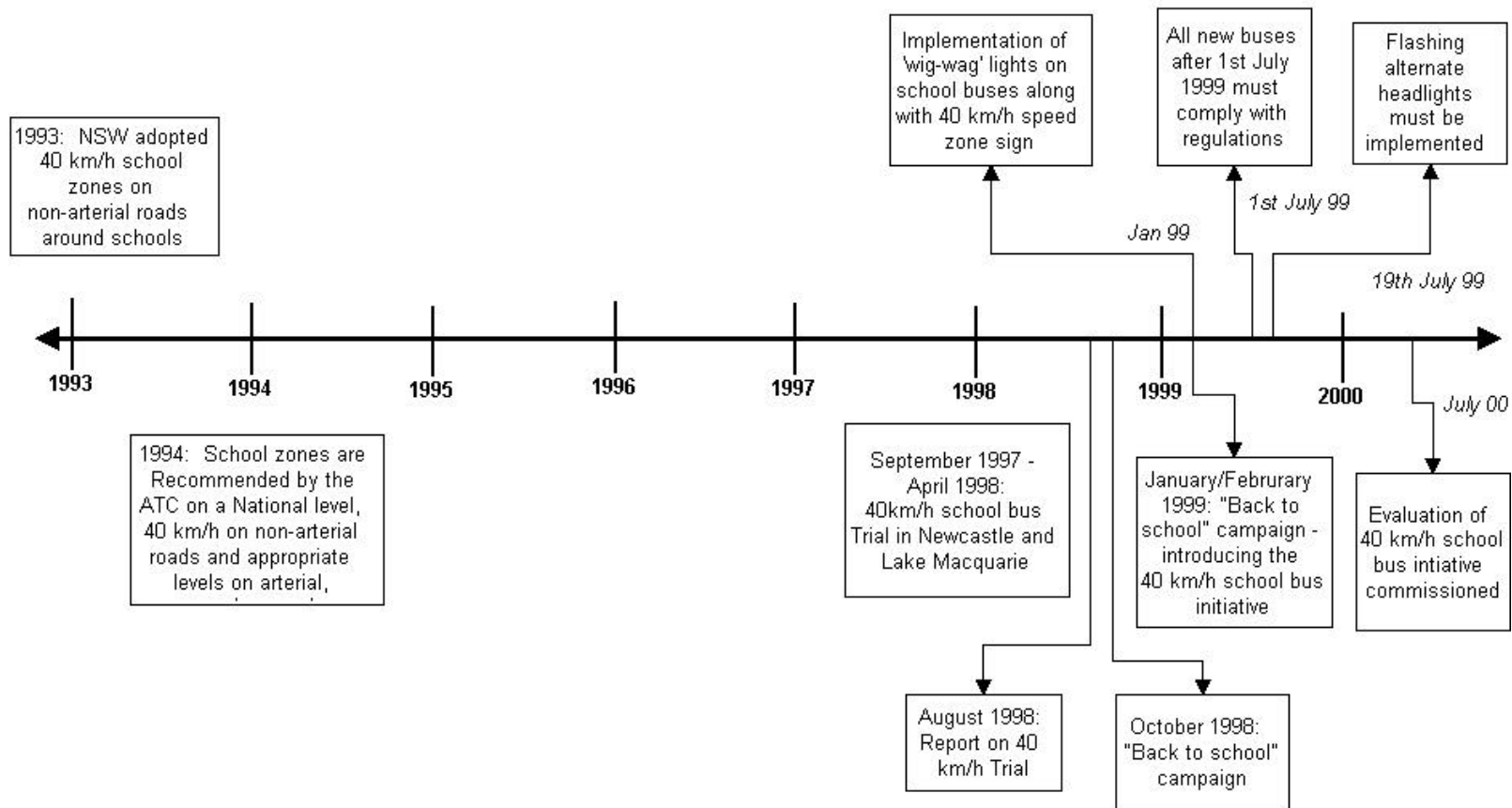


Figure 1: Timeline of events leading up to the implementation of the 40 km/h school bus initiative



Figure 2: Image of school bus in the Sydney metropolitan area



Figure 3: Image of school bus in Albury, NSW



Figure 4: Image of school bus in Sydney metropolitan area



Figure 5: Image of school bus in Sydney metropolitan area

## **Setting the framework, scope and objectives of the evaluation**

To begin the evaluation process a number of objectives must be determined and agreed upon. The objectives of the 40 km/h initiative evaluation were:

- ?? To develop an understanding of attitudes towards the initiative from bus drivers, bus operators, the NSW Bus and Coach Association, NSW Police, Department of Transport staff and road users, in particular drivers.
- ?? To undertake an analysis of road fatality and injury data, in order to determine, if possible, any effect of the initiative on crashes since its implementation, in particular the effect on bus-related crashes.
- ?? To develop an understanding of motorists response to the initiative through observations and analysis of vehicle speed data.
- ?? To assess motorist response to the additional School Bus Stop Blackspots Zone initiative, and identify if there is any difference in response compared to the general 40 km/h School Bus initiative.

To achieve the objectives detailed above, the following three stages were completed. Each stage involved one or more tasks specified by the RTA.

Stage 1: Collection of information on community attitudes towards the initiative, through the use of telephone surveys, the perspectives of stakeholders through face-to-face interviews, media tracking conducted by the RTA following the 40 km/h speed limit public education campaign and a number of focus groups involving bus drivers from metro and rural areas.

Stage 2: Analysis of injury accidents for the three years prior to the implementation of the 40 km/h bus initiative and the 12 months after implementation, for a number of school bus routes. The number of rear-end and side swipe accidents were analysed together with accidents involving school children, pedestrians and buses.

Stage 3: Observations of driver behaviour and speeding behaviour in both rural and urban environments. This stage included a pilot study on the chosen method of observation.

Descriptions of the tasks that were undertaken as part of the study are outlined below. Although these tasks are specific to the evaluation conducted as part of the 40 km/h initiative, many aspects are transferable to other road safety programs.

### ***Stage 1:***

#### **Media tracking surveys**

To promote public education of the 40 km/h school bus initiative, a media campaign was launched by the RTA to coincide with its introduction and the beginning of the 1999 school term. This task summarised the views amongst both parents/carers and drivers of the 40 km/h speed restriction around buses campaign. These results were drawn from a media tracking report completed by the RTA. The report details the two mass media campaigns launched by the RTA during the end of 1998 and the beginning of 1999.

### **Community attitudes surveys**

A survey of community views on the school bus initiative, including the 40 km/h speed limit around school buses, the flashing lights mounted on the buses and the special bus stop black spot zones was conducted. The aim of the surveys was to determine any specific issues drivers in metro areas and rural areas had experienced in relation to the 40 km/h school bus initiative and to gather feedback on specific issues previously identified by the RTA.

Within the questionnaire drivers were requested to describe:

- ?? Their awareness of school bus flashing lights and associated regulations;
- ?? Their knowledge of what drivers are required to do when school bus lights are flashing;
- ?? Any problems that they have encountered or are aware of regarding the operation of the regulation;
- ?? Any suggestions for improvements to the regulation or associated lights, signs etc.; and,
- ?? Relevant demographic details.

### **Stakeholder attitudes and experiences**

In addition to obtaining the views of NSW road users following the implementation of the 40 km/h flashing lights bus initiative, the evaluation also sought views from a number of stakeholders.

Individual face-to-face interviews were conducted with representatives of key stakeholders. The interviews focussed on issues identified by each stakeholder concerning the initiative, including issues brought to the attention of the stakeholder by members of the public or other organisations and suggestions for improvements or amendments to the initiative.

### **Focus groups with NSW school bus drivers**

To tap the views of school bus drivers, who were integral participants involved in this initiative, small focus group discussions were undertaken. Group discussions were conducted as these were thought to be more appropriate than individual interviews for identifying aggregated group information.

The aims of the focus groups were to:

- ?? Identify any operational difficulties facing bus drivers as a direct result of the 40 km/h initiative.
- ?? Highlight any issues with the initiative, either for the bus drivers themselves, for motorists, or for student pedestrians around school buses.
- ?? Unearth any positive outcomes of the initiative.
- ?? Glean an overall impression of the initiative as perceived by bus drivers.
- ?? Probe for any suggestions or recommendations for further improvements to the initiative, or for increased student pedestrian safety around school buses.

### ***Stage 2:***

#### **Accident Analysis**

The accident analysis was based on a representative group of school bus and commercial bus routes in ten LGAs throughout NSW. The LGAs were categorised as urban or rural. The urban LGAs were

Parramatta, Bankstown, Hurstville, Liverpool and Baulkham Hills. The rural LGAs were Albury, Goulburn, Orange, Dubbo and Tamworth.

Maps of each of the LGAs were created depicting all bus routes within each LGA. The bus routes were based on route maps supplied by the Department of Transport. The routes were coded onto a digital road network using ArcView GIS v3.2. Geocoded accidents, supplied by the RTA's road information services section, were overlaid onto the digital network. Any accident that occurred on a school bus route or commercial bus route was identified and coded as appropriate.

Thirty-six months, January 1996-December 1998, before the implementation of the 40 km/h initiative and 18 months after the implementation, February 1999-July 2000, have been used for the analysis.

#### ***Stage 1:***

#### **Observations – Urban sites**

Observations of motorists' behaviour while passing a stopped 'school bus' at bus stops was viewed as crucial to our understanding of the effectiveness of the initiative.

In urban areas the observations were completed using video technology and speed data collection at a representative sample of ten bus stops in the Sydney metropolitan area.

For this evaluation the video trailer was located as far from the bus stop as possible whilst maintaining a view of the bus stop and the adjacent traffic lanes. It was also essential to ensure the lights on the bus were easily distinguishable when activated.

The video trailer operated for one day (7:30am-9:30am and 2:30pm – 5:30pm) at each site.

During the observation period, speed measurements were also obtained using traffic counters. The counters measured axle speeds in each lane adjacent to the bus stop. The counters were installed for five working days at each site.

#### **Observations – Rural sites**

The method selected for the evaluation in rural areas also involved video and speed data collection.

The method required the project team to follow a school bus along its designated route and record vehicle movements on video tape, using a video camera, and vehicle speeds on computer, using a laser speed gun. A pilot of the technique was completed in Victoria prior to travelling to NSW. As a result of the testing, this technique was deemed the most suitable and appropriate technique for collecting the data.

The routes selected were based on discussions with bus companies operating in each of the selected towns. The operators were asked by the project team members to identify school bus routes that travelled on highways and arterials in remote and rural areas, which also included a number of stops along the route on these roads. Ten routes were observed in the morning and afternoon runs over a ten-day period.

#### **Bus stop blackspot zones**

To improve the safety of bus stops on high speed roads that provided no protection to passengers disembarking or alighting the bus, bus stop black spot zones were implemented as a possible

alternative. The technical specifications of the bus stop black spot zones fall under an RTA Technical Direction (no. 98/14).

The Sydney Operations Directorate of the RTA indicated there were ten sites in metropolitan Sydney and a further five sites in Newcastle. Speed surveys were conducted at two of the sites listed.

### **Conclusions**

As indicated previously, the results of the 40 km/h evaluation are not presented in this paper. The intention was not to describe the outcomes of the project, but rather to describe a multi-dimensional approach to evaluating a road safety initiative. Application of the techniques described in this paper can be modified for other road safety program evaluations. The benefits of completing such evaluations assist practitioners in determining the effectiveness of road safety programs and provides feedback for strategic approaches to reducing road trauma.

### **References:**

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