

## Evaluation of speed trailers in Canterbury

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### Abstract

*A speed trailer, a type of speed information device which tells vehicles how fast they are travelling, has been used in Christchurch for several years. The Christchurch City Council and the Land Transport Safety Authority evaluated the effectiveness of speed trailers using four separate surveys. Measurement of the speeds of free running vehicles before and after the speed trailer with a control survey when the trailer was not present found that the trailer had an effect on speeds for at least 200 metres downstream of the trailer. A survey of 27 schools found that most thought the trailer had an effect on vehicle speeds, raised awareness of vehicle speeds, and helped learning about speeds. Most would like to use the trailer again and were positive and supportive of the trailer. Drivers interviewed after they had passed the trailer had noticed it and knew what it was. Nearly half of them made positive comments about the trailer. Those installing the trailer had found no serious shortcomings but thought the trailer could be lighter and more damp proof. The researchers concluded that the trailer does slow traffic, that it makes drivers more aware of their speeds and that it provides an educational tool for schools and their communities.*

### 1. Introduction

A speed trailer is a type of speed information device (SID). It is a trailer that can be parked at the side of the road, with an electronic sign at the top set to show passing vehicles how fast they are travelling. Most can be set to show how much the fine would be if the driver is exceeding the speed limit.

Speed trailers have been used in Christchurch for several years. Some initial trials showed that vehicles slowed down when they passed a trailer. These trials were positive. However there has been little evaluation of the effect of speed trailers as a tool in raising awareness of speed issues in the community.

Wall et al (2002) <sup>(1)</sup> surveyed motorists in New South Wales after they passed a SID and found that the majority of drivers were aware of the device and what it was for.

Mabbott and Cairney (2002) <sup>(2)</sup> reviewing the use of SIDs in Australia and New Zealand comment that there has unfortunately been no formal evaluation in this country.

A survey to evaluate a speed trailer in New Plymouth <sup>(3)</sup> asked questions about awareness of speed trailers and reasons for slowing or not slowing. Hutt City Council <sup>(4)</sup> has carried out a study of speeds on sections of road without a speed

trailer, then a week later with a speed trailer. This showed that there was a decrease in both mean and 85%ile speeds in most locations. Speed measurements after the campaign showed the speeds increasing almost but not quite to the original levels. A survey of speeds at work sites on state highways <sup>(5)</sup> with speed trailers covered and uncovered was unable to show the uncovered trailer as having any effect. However, a number of other variables affected the data.

The Land Transport Safety Authority has produced a traffic note <sup>(6)</sup> on the use of speed trailers. The Traffic Note sets out guidelines for design and deployment of speed trailers and asks for evaluations to be carried out and communicated to the Land Transport Safety Authority, so that future guidelines can advise on obtaining maximum impact from the trailers. The Traffic Note quotes a study from the USA by Casey and Lund <sup>(7)</sup> which showed that the trailers did reduce driver speeds.

In Christchurch City and elsewhere speed trailers have been used by schools to provide projects for students and raise awareness in the community. Comments from those involved have been positive, but more information was needed on how they are used and what the effects are.

Speed trailers are used in areas where speed is a problem with the aim of slowing traffic. However, they are also used to give residents and schools a tool to record traffic speeds. They allow groups in the community to raise awareness among drivers of the issue of speeding.

When evaluating the effectiveness of speed trailers these aspects of their use should be taken into account as well as the issue of whether drivers slow down when they see them. Speed trailers can be used in a variety of situations. It is important to find out which situations are most effective so that they may be deployed for maximum effect.

## **2. Aim**

To produce research that will apply nationally showing benefits of speed trailers, effectiveness of speed trailers in modifying speed behaviour, the best ways to use speed trailers, and how speed trailers may be developed and improved.

## **3. Objectives**

The objectives of this study were:

- (a) To measure speeds of drivers before they have passed the speed trailer and after they have passed the speed trailer to see whether there is a difference in speeds, and to do this in a variety of situations.

- (b) To interview drivers after they have passed a speed trailer and ask whether they noticed the speed trailer, whether or not they slowed down and why, and what their attitude is to speed trailers.
- (c) To survey schools and those who have requested or used the speed trailer to find out whether it was useful and what impact they felt it had on speeding behaviour and attitudes.
- (d) To interview those deploying speed trailers to find out the various uses of speed trailers, how easy the data collection is, where are the best locations to set up speed trailers and what improvements might be made to them.

#### **4. Method**

Four separate surveys were used to gain an understanding of the effectiveness of speed trailers. These were:

- (a) Speed surveys on roads with and without a speed trailer present.
- (b) Interview surveys of drivers who had driven past the operating speed trailer.
- (c) A survey of schools by postal questionnaire.
- (d) A telephone survey of speed trailer users.

A small group met and designed questionnaires for the various surveys. The questionnaires for each survey were different but maintained a similar format. Standard forms were used for the speed surveys.

##### **4.1 Measurement of traffic speeds**

A speed trailer was operated on arterial roads at three locations with different speed limits. Speeds of free-running vehicles were noted before drivers saw the speed trailer and after they had passed the speed trailer. Further downstream, drivers were stopped and interviewed at a Police checkpoint. Control speed checks were carried out at the same sites at the same time and day of the week without the speed trailer or checkpoint present.

The sites were chosen to ensure that the speed trailer was not visible from the site of the first speed check. Similarly, the site of the second speed survey was not visible as drivers passed the speed trailer. There was some concern that drivers approaching from the opposite direction might be flashing their lights or otherwise alerting drivers to the presence of the Police checkpoint. However, this could be accounted for to some extent by the control surveys.

The digits on the number plate were also recorded with the vehicle speed at each site to try and match the speeds of individual vehicles with driver responses to the interview at the Police check point.

Speeds were measured from a parked vehicle by a different method at each location – using a digitector with cable detection before the trailer site and a laser gun after the site.

#### **4.2 Interviews with drivers who passed the speed trailer.**

These were done in association with the speed surveys. Police stopped drivers after they had passed the speed trailer. The Police checkpoint for the driver interviews was not visible from the second speed check. A team of six students recruited through Student Job Search interviewed drivers. Drivers were asked a number of questions including why they did or did not slow after passing a speed trailer. Where possible their responses were matched to their measured speeds prior to the checkpoint.

#### **4.3 Survey of schools**

Survey forms were posted to schools where the speed trailer had been used. Principals or teachers were asked to complete the survey and return it by post.

#### **4.4 Interviews with those who install speed trailers**

Road safety co-ordinators, Police and others who had set up speed trailers were interviewed by telephone to find out what problems they had with them, what the optimum circumstances are for their use, how they might be improved, and how well the data collection works.

### **5. Results**

#### **5.1 Speed measurements**

	Speed Limit	Without Trailer		With Trailer	
		Before Trailer Site	After Trailer Site	Before Trailer Site	After Trailer Site
Pages Road	50 km/hr	50.0	55.4	51.2	51.8
Halswell Road	60 km/hr	60.0	59.3	59.9	56.6
Marshland Road	80 km/hr	76.9	76.5	76.5	73.3

**Table 1. Mean Speeds of All Free Running Vehicles (km/hr)**

Table 1 above shows that the speed trailer did have an effect on mean speeds for at least 200 metres downstream of the trailer, with reductions of around 3km/hr at each site. Table 2 below shows 85%ile speeds reduced by 4 km/hr at all sites with the trailer present.

	Speed Limit	Without Trailer		With Trailer	
		Before Trailer Site	After Trailer Site	Before Trailer Site	After Trailer Site
Pages Road	50 km/hr	54	60	56	56
Halswell Road	60 km/hr	65	65	65	61
Marshland Road	80 km/hr	84	83	83	79

**Table 2. 85%ile Speeds of All Free Running Vehicles (km/hr)**

Looking at the matched speeds of vehicles passing the trailer site it was also clear that drivers travelling in the higher speed brackets reduced speed more at all sites when the speed trailer was present than when it was not. The detailed results are shown in Tables A1 to A3 in the Appendix.

## **5.2 Interviews with drivers who passed the speed trailer.**

Drivers were interviewed at three sites after they had passed the speed trailer. Police Officers, out of sight of the trailer, pulled drivers over. Students carried out the interviews. The three sites were at Pages Road (50km/hr speed limit), Halswell Road (60km/hr) and Marshland Road (80km/hr). A total of 544 drivers were interviewed with 177, 178 and 189 drivers respectively at the three sites.

The main findings from the driver interviews were:

- Nearly all respondents (94%, 97% and 97%) said they noticed the speed trailer as they drove past.
- 94% said they understood that the trailer told them how fast they were going or was a reminder to check their speeds.
- About 12% of respondents said they thought the speed trailer might be used to give tickets to speeding drivers.
- Over 80% of drivers at each site said they were travelling within 10km/h of the speed limit when asked what speed they thought they were travelling before they saw the speed trailer.
- Nearly 13% of the drivers in Pages Road, 21% of drivers at Halswell Road, and 5% of drivers at Marshland Road indicated that they did not know the correct speed limit on the road.
- At Pages Road nearly half the drivers thought the speed limit should be 60km/h instead of 50km/h.

- In Halswell Road about 16% of drivers thought the speed limit should be only 50km/h instead of 60km/h which it is at present. Another 4% thought it should be between 50km/h and 60km/h.
- About 15% of drivers in Marshland Road thought the speed limit should be 100km/h rather than 80km/h, with a further 5% saying it should be higher than 80km/h.
- About 73% of drivers in Pages Road, 77% of drivers in Halswell Road and 69% of drivers in Marshland Road said the speed trailer made them more aware of their speeds.
- 36% of drivers in Pages Road, 34% of drivers in Halswell Road and 28% of drivers in Marshland Road said they reduced speed as a result of seeing the speed trailer. It should be noted that many drivers said they were driving at or below the speed limit when they passed the speed trailer.

Drivers were asked if they wished to make comments about the speed trailer. About 55% of drivers made comments, most of them positive and supportive of the use of speed trailers. Some drivers felt there should be more speed limit signs. Several drivers at each site felt there should be more speed trailers.

Responses to questions in the interviews were compared with recorded speeds for drivers. There was no relationship between the speeds drivers said they were travelling and the speeds they were measured at. They were as likely to have been travelling slower than they said as to have been travelling faster than they said.

Similarly comparing drivers who said they increased or decreased their speed as a result of seeing the speed trailer showed that many drivers were not aware that they had decreased their speed. Note that most of the drivers who increased their speed were travelling below the speed limit.

### **5.3. Survey of schools**

Twenty seven schools completed the speed trailer questionnaire.

Most schools had someone from the school involved in setting up the speed trailer. A quarter of the schools did not find the trailer easy to operate. The only problem mentioned in relation to the speed trailer was its weight.

The survey asked whether the school thought the speed trailer affected the awareness of vehicle speeds in their community. Almost every respondent thought that it did. Most respondents (78%) said they noticed a reduction in vehicle speeds when the trailer was operating.

Responses indicated that the trailer had promoted learning about speeds both among the students and among the drivers.

Nearly half the schools made comments about additional benefits from the speed trailer. Seven schools (26%) had used the trailer to teach maths or statistics skills. A further six schools (22%) said it made drivers more aware that the school is there and focussed their attention on their speed.

Most schools (85%) said they would like to use the trailer again. Nearly half them thought the trailer was available often enough. About 22% thought it was not. Currently the trailer is in constant use and booked up for several months in advance. About 80% of schools considered once a term or once every six months an ideal frequency for its use.

Eighteen of the twenty seven schools provided additional positive supportive comments about the trailer.

#### **5.4. Interviews with those who install speed trailers**

Interviews were carried out with five people who regularly set speed trailers up in their local areas. The aim of these interviews was to find out what problems there are with the trailers, and whether some types of sites are better than others when positioning them.

‘Check Point’ trailers made by Autons were the most commonly used, but one installer had used both the ‘Check Point’ trailer and a second model available in Christchurch produced by Ken Hay.

Most installers felt the trailers were fairly easy to operate. Comments indicate some modifications have improved ease of use. Three out of five installers thought the operating instructions were clear and adequate. One other installer thought they were clear but not adequate. The installers all had ways of charging the batteries - some of them at home, some in the place where the trailer was stored.

The main problems cited were the weight of the trailer and difficulties with collecting data. Suggested improvements to the trailer included making it easier to change the tyres and making the electric terminals secure. Damp proofing the trailer and finding a way of making them lighter were suggested. Three out of the five installers said they found it easy to get data from the trailer’s data collection system. The other two had difficulties with downloading data.

Installers considered the best locations for a speed trailer to be outside schools, areas where residents perceive a problem with speed, and high crash risk areas. Some installers thought high speed areas were not suitable. Others thought they were most suitable.

When asked about the benefits of using the speed trailer the installers mentioned slowing traffic speeds, raising awareness of speed behaviour and empowerment of the community.

## **6. Conclusions**

The presence of the speed trailer did have an effect on the speed of traffic at the three locations surveyed. Drivers slowed down more when the speed trailer was present than when it was not.

The interviews with drivers showed that drivers felt they were made more aware of their speed by its presence. Most drivers were positive about speed trailers. Many drivers did not know what the speed limit was in the area where they were being interviewed. There was no relationship between the speeds drivers said they were travelling and the speeds they were measured at. Similarly, many drivers were not aware that they had decreased their speed.

Most schools were positive about the speed trailer. Many of them had used the trailer for maths projects. Most schools felt the trailer had raised awareness of the issue of speed in their communities. There were also comments that the presence of the school was made more obvious and that the students had been made aware of the need to keep themselves safe. Most schools would like to use the speed trailer again, once a term or every six months. Nearly a quarter of schools felt the speed trailer was not easily available. It is usually booked up for several months in advance.

Installers had used both the Auton 'Check Point' trailer and the trailer built by Ken Hay. They were positive about speed trailers and their role in slowing traffic and raising awareness of speed issues. However there were ways in which they felt trailers could be made easier to use, in particular being made lighter and more weather-proof. They also felt that recharging the batteries, changing tyres and collecting data from the trailers could be made easier.

Speed trailers seem to be of benefit in the community both by slowing traffic speeds and by raising awareness of speed issues. Schools seem to find them especially useful in promoting the need to slow down near the school to drivers and in getting road safety into the maths curriculum.

## **7. References**

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- (6) Land Transport Safety Authority, Traffic Note 23, Land Transport Safety Authority May 2000
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## **7. Acknowledgements**

Thanks to the Christchurch City Council for funding for the project.  
Thanks to the Land Transport Safety Authority for resources for the project.  
Thanks to the students who carried out interviews and entered data.

## Appendix

**Table A1. Speed Decreases of Vehicles Passing the Speed Trailer in Pages Road**

Note: A negative figure indicates a mean increase in speed.

Speed Before Trailer Site (km/hr)	Without Trailer		With Trailer	
	Number in Sample	Mean Speed Decrease	Number in Sample	Mean Speed Decrease
36 – 40	3	-18.0	3	-9.7
41 – 45	20	-11.2	11	-8.0
46 – 50	67	-6.0	47	-3.5
51 – 55	53	-4.6	58	-0.3
56 – 60	10	-0.7	19	3.3
61 – 65	-	-	2	17.0

**Table A2. Speed Decreases of Vehicles Passing the Speed Trailer in Halswell Road**

Speed Before Trailer Site (km/hr)	Without Trailer		With Trailer	
	Number in Sample	Mean Speed Decrease	Number in Sample	Mean Speed Decrease
41 – 45	-	-	1	-12.0
46 – 50	11	-2.4	2	-3.0
51 – 55	20	-1.2	18	-1.4
56 – 60	42	-1.6	41	1.8
61 – 65	31	1.3	28	3.7
66 – 70	10	-0.2	6	7.3
71 – 75	3	3.3	4	10.7
76 – 80	1	9.0	-	-
> 80	1	5.0	-	-

**Table A3. Speed Decrease of Vehicles Passing the Speed Trailer in Marshland Road**

Speed Before Trailer Site (km/hr)	Without Trailer		With Trailer	
	Number in Sample	Mean Speed Decrease	Number in Sample	Mean Speed Decrease
60 or less	4	-17.7	1	-15.0
61 – 65	9	-8.7	7	-2.9
66 – 70	16	-5.0	18	-0.3
71 – 75	32	-1.5	32	1.1
76 – 80	40	0.2	54	3.0
81 – 85	25	1.1	39	5.8
86 - 90	7	6.6	5	11.2
91 – 95	2	5.0	2	17.0
96 – 100	1	7.0	1	19.0
> 100	1	15.0	-	-