Case Study

ENVIRONMENTAL DRIVER TRAINING (RIGID VEHICLE)

TRIAL SUMMARY

This trial sought to quantify the fuel efficiency benefits of implementing environmental driver training. The trial was conducted for nine rigid vehicles running LPUD (local pick-up and delivery) applications in Sydney and Melbourne.	Average fuel consumption benefit (%)	GHG benefit (g CO_2-e/km)	Average relative idle reduction (%)
	7% ↑	7% ↑	76% ↑

↑ performance better than conventional vehicle
↓ performance worse than conventional vehicle

The *Green Truck Partnership* is designed to be a forum for the objective evaluation of the merits of clean vehicle technologies and fuels by heavy vehicle operators. This report discusses the results of an environmental driver training trial conducted under the program in 2012.

1 ENVIRONMENTAL DRIVER TRAINING

Environmental driver training has the potential to reduce fuel consumption and vehicle wear and tear, as well as have recognised safety and staff morale benefits. The fuel efficiency elements of traditional driver training programs have recently been repackaged under the banner of environmental driving. Environmental driving essentially involves operating the vehicle in certain ways in order to optimise fuel consumption.

Training can be delivered in different formats: online, in the classroom, using simulators or in the vehicle itself (in-cab).

Immediate fuel efficiency results can be realised for a relatively low initial capital expenditure (in addition to the driver's time). However, the permanence of the improvement is uncertain, and refresher courses are critical to ensure long-term improved behaviours. Other variables include the driver's personal commitment as well as the prevailing local driving culture, road conditions and road systems.

While a number of Australian training companies promoting improved driver practices report a 5–20% reduction in GHG emissions, the potential to reduce fuel consumption and emissions in Australia through a change in driver behaviour still remains relatively undocumented.

2 TRIAL OBJECTIVE

The purpose of this trial was to assess the real-world economic and environmental performance of rigid vehicles operated by drivers who had undergone environmental driver training.

3 METHODOLOGY

DATA COLLECTION

This trial involved an in-field assessment of nine rigid vehicles operating LPUD distribution routes in metropolitan Sydney and Melbourne. The vehicles operated over an average 10-week period between April 2012 and July 2012.

Of the nine drivers participating in the trial, seven undertook both simulator and in-cab training, and one driver undertook simulator-only training. Although one of the drivers could not participate in either form of training, the performance of his vehicle was still monitored for comparative purposes and has been included in the analysis.

The driver training for this particular trial focused on the following aspects of vehicle operation and behaviour.

- Gear shifting
- Speed
- Acceleration and cruise control
- Steady braking
- Idle time
- Planning and observation
- Route planning
- Driver awareness and attitude.

During the trial period, data loggers were used to collect data from the vehicles to ensure validity of the fuel comparison following driver training. The data collected by the loggers included:

- **DISTANCE**: kilometres travelled
- **IDLE TIME**: time spent at idle
- **AVERAGE SPEED**: average speed (km/h).

Other datasets were collected but were not relevant to this particular trial.

During the trial period, fleet fuel records were used to capture fuel consumption data (as this could not be captured from the data loggers). The fuel data included:

- **FUEL CONSUMPTION**: total fuel (litres).

DATA ANALYSIS

Key descriptors considered in this analysis included idle time and fuel consumption.

This data was used to assess the average fuel consumption of the vehicles 'before' and 'after' driver training. The results of this comparison are discussed in Section 4.

Given that these vehicles were performing similar delivery tasks, the daily distance travelled by each vehicle was considered sufficient to ensure the validity of the fuel consumption comparison.

Figure 1 shows the recorded average daily kilometres travelled by each vehicle before and after driver training.

4 RESULTS

Figure 1 shows that there was a good correlation between the distance travelled both before and after the drivers were trained. The lack of significant variation in the delivery journeys undertaken across the trial period, shows that any difference in fuel consumption was a result of driver influence.

A summary of the results for each of the trial vehicles following driver training is provided in Table 1. Comparison of the fuel consumption results indicate that vehicle fuel efficiency following driver training improved by an average of 7% (Figure 2) with total idle time reducing by an average of 76% (Figure 3). The amount of time each vehicle spent idling (as a proportion of their total vehicle engine hours) also reduced by an average of 64% (Figure 4).

Analysis of the data showed that fuel efficiency benefits following both simulator and in-cab training varied between drivers. For example, for Driver 1 there was a 16% improvement in fuel consumption following training. Although fuel consumption increased by 5% for Driver 6, there was a marked decrease in the amount of time spent idling (79%), meaning that other factors (such as vehicle load) could have influenced fuel consumption during the trial period.

In comparison, the driver who undertook simulator-only training received a fuel efficiency benefit of 2%, which was below the 7% average fuel efficiency improvement for drivers who had undertaken both simulator and in-cab training.

Analysis of the GHG performance (Figure 5) reveals that the GHG emissions generated by the trial vehicles were, on average, 7% lower than before the training intervention.

5 CONCLUSION

The findings of this trial suggest that implementing environmental driver training for drivers operating rigid vehicles for a LPUD application in metropolitan areas delivers:

- an average fuel cost saving of approximately 7% relative to vehicle operation without training intervention (Figure 6);
- an average net GHG emission benefit of 7% (an average of 52 g CO_2-e/km) relative to vehicle operation without training intervention.

Table 1 Vehicle performance after driver training intervention

Driver	Vehicle size	Fuel saving (L/100 km)	Relative fuel saving (%)	GHG benefit (g CO_2-e/km)	Economic benefit ($/100 km)	Reduction in idle time as a proportion of total engine hours (%)	Total daily idle time reduction (%)
Driver 1	4 t	4.34	16	117.0	6.07	59	63
Driver 2	4 t	3.93	13	106.1	5.50	74	89
Driver 3	6 t	2.57	8	69.3	3.60	32	51
Driver 4	4 t	2.45	11	66.0	3.43	79	86
Driver 5	4 t	1.32	5	35.7	1.85	73	80
Driver 6	4 t	–1.12	–5	–30.1	–1.56	65	79
Driver 7	4 t	1.34	6	36.2	1.88	54	91
Driver 8 (simulator-only training)	6 t	0.64	2	17.2	0.89	70	72
Driver 9 (no training)	6 t	n/a	n/a	n/a	n/a	n/a	n/a

Figure 1
Average daily distance travelled before and after driver training

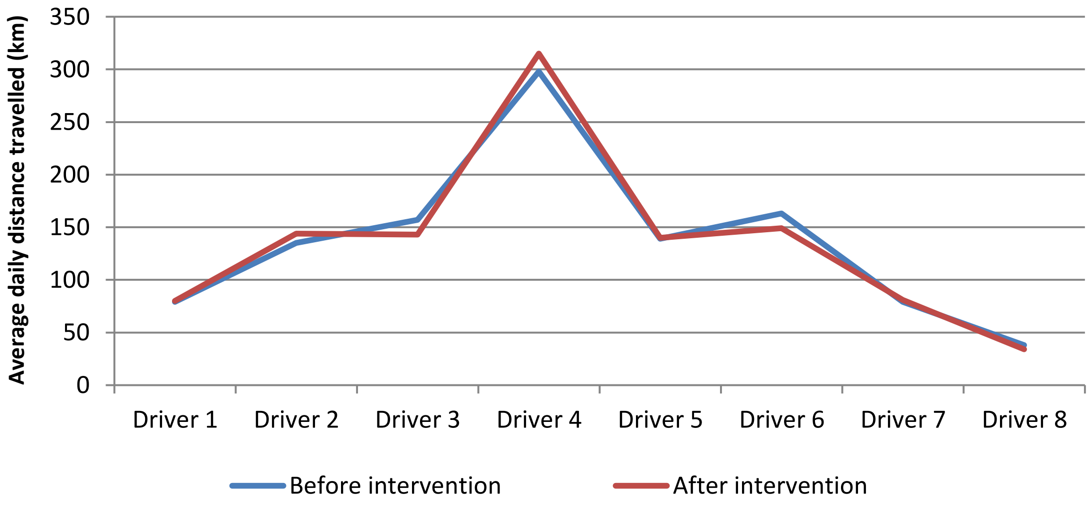

Figure 2
Comparison of vehicle fuel consumption before and after driver training

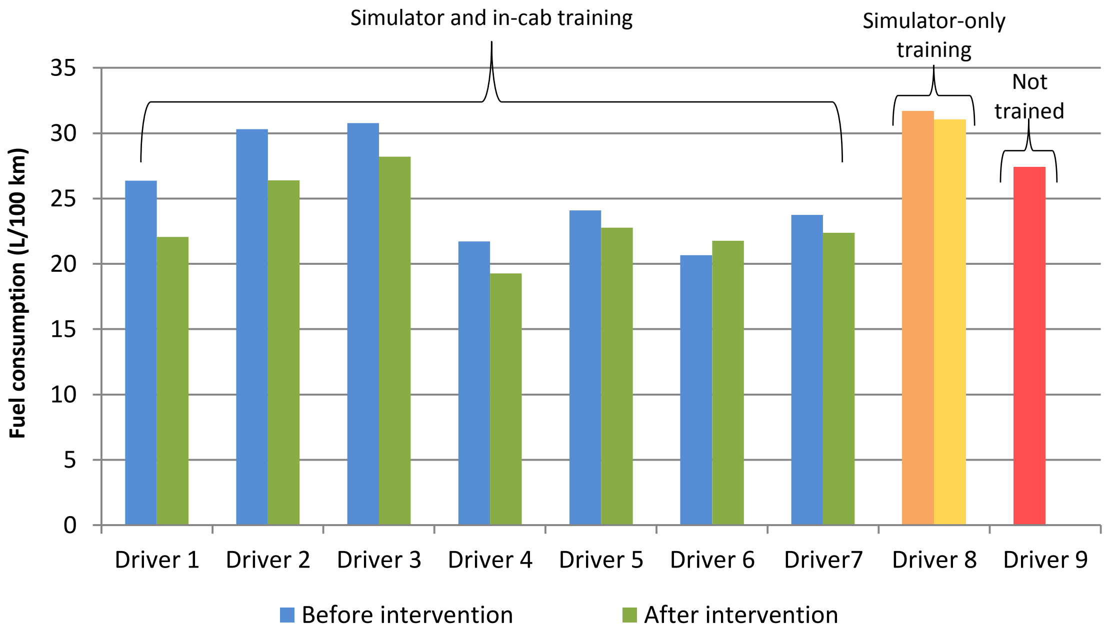

Figure 3

Comparison of total time spent idling before and after driver training

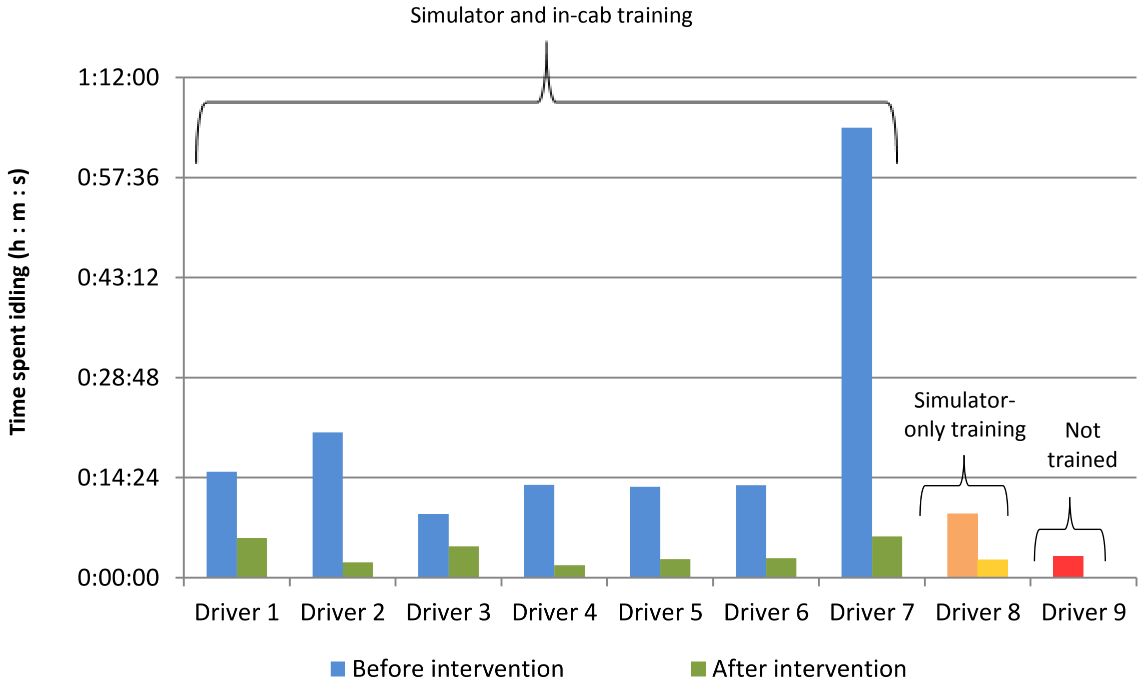

Figure 4

Comparison of percentage time spent idling as a proportion of total engine hours before and after driver training

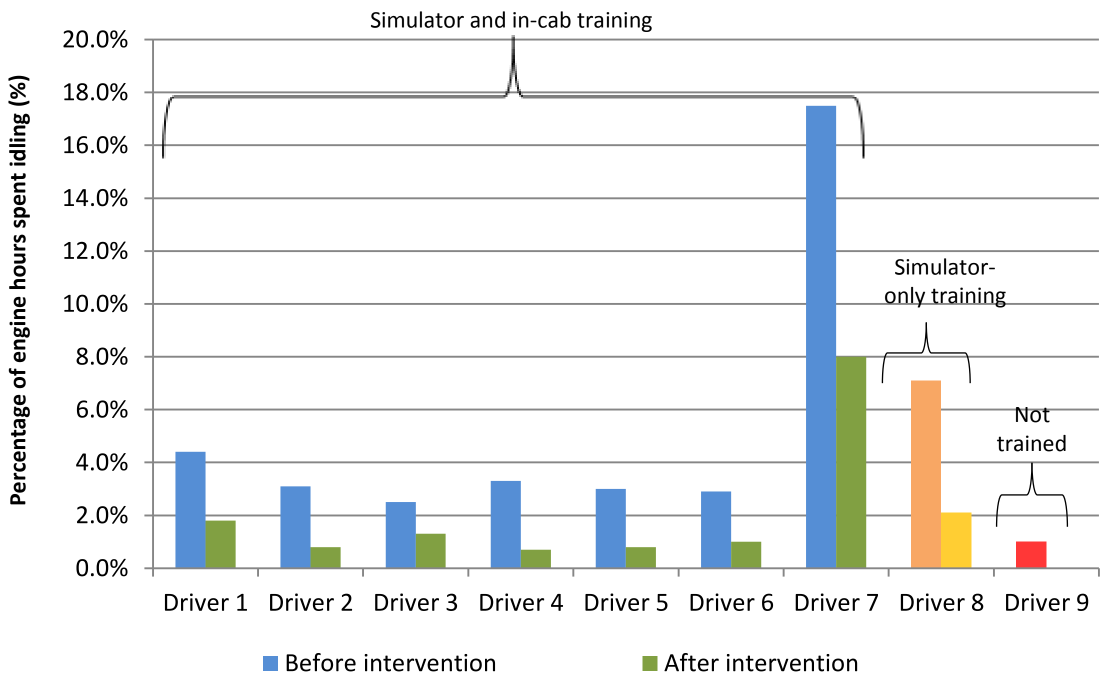

Figure 5
Comparison of vehicle GHG emissions before and after driver training

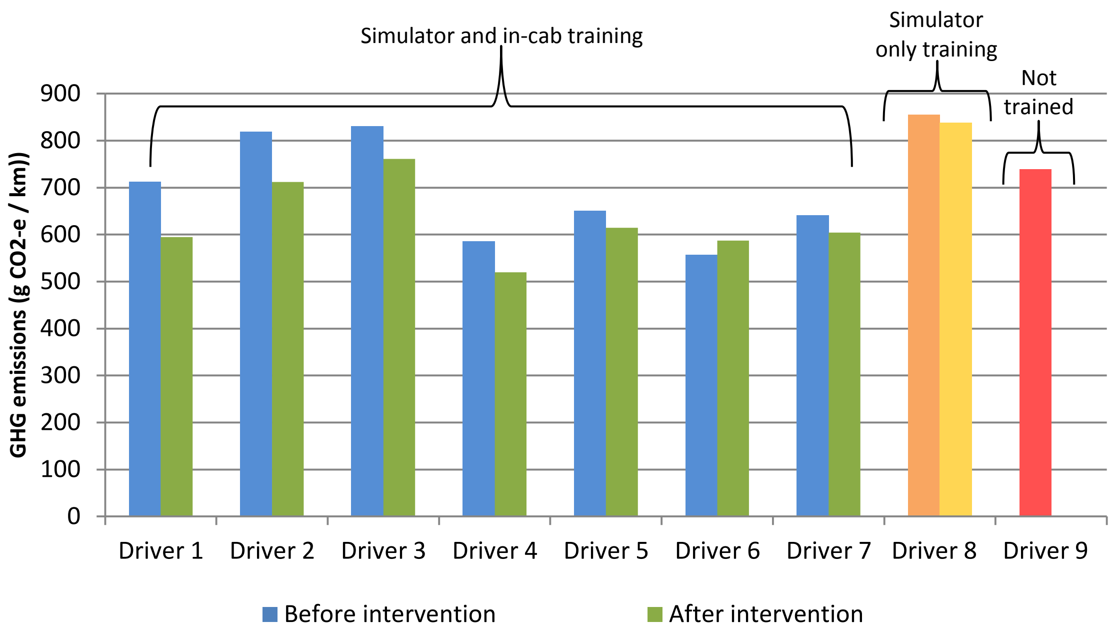

Figure 6
Comparison of fuel cost before and after driver training