

Fuel Efficiency Culture – The Attitudes of Commercial Vehicle Drivers

Dr Christopher Kissling

Kissling Consulting Limited, New Zealand

Dr Michael Coyle

Director of Fuel Efficiency

M2 Training Limited, UK

Dr Jean-Paul Thull

Senior Lecturer in Transport Studies

Lincoln University, NZ

ABSTRACT

In 2008 research was conducted for the New Zealand government to develop an understanding of the commercial vehicle fleet operators' practices, attitudes, perceptions and barriers to change, in relation to fuel-efficiency, fuel use monitoring and fleet management practices in New Zealand. The study used a stratified sample, utilizing fleet size and industry sectors. 'Face-to-face' interviews took place with 300 drivers, along with a telephone survey of 300 operators and in-depth interviews with 54 operators and six key industry figures.

This paper focuses on the responses of the 300 drivers surveyed. It is the attitude and willingness of drivers that is a critical element in most interventions aimed at achieving improved fuel efficiency in the commercial vehicle fleet. The pursuit of fuel efficiency can also result in a better safety environment.

KEYWORDS

Commercial vehicle fleet drivers, practices, attitudes, perceptions and barriers to change, fuel-efficiency, fuel use monitoring and fleet management practices.

INTRODUCTION

In order to improve fuel efficiency and reduce the environmental impact of road transport, the New Zealand Government in 2008 commissioned a research project the aims of which were to establish an understanding of vehicle fleet operators, practices, attitudes, perceptions and barriers to change, in relation to fuel-efficiency, fuel use monitoring and fleet management practices. In this case fleet operators are defined as operators of vehicles ranging from taxis to the largest commercial vehicles.

The findings indicated not only the overall national picture, but also any sector specific problems, sector specific examples of best practice and generic best practice. Additionally, preferred sources of information and channels of communication were selected by respondents, thereby ensuring any subsequent information would be appropriate, provided by a source acceptable to them and delivered through a

favoured medium. The output was a report submitted to the Ministry of Transport. It is now available on the Ministry of Transport's website.¹

RESEARCH APPROACH

The research approach consisted of a literature review, use of questionnaires in both telephone and face-to-face interviews, with a high level of generic content to enable the same items of interest to be discussed by different stakeholders. This allowed for amongst other things differences of perception and opinion to be identified and taken into consideration. In this paper we focus upon the survey of drivers but refer to the other surveys where appropriate.

Similar and smaller scale and narrower projects had been conducted in the past in both New Zealand (Baas and Latto, 2005; Baas, Latto and Ludvigson, 2005) and the UK (ECG 59, 1996; Ratcliffe, 1980 and Coyle, 1999). Two additional UK government surveys were conducted that looked into attitudes in 1998 (DETR 1998a and DETR 1998b), but this was the first project on this scale that covered road commercial transport in its entirety. The range of operators included light vehicles (car fleets, taxis and minibuses) through to heavy vehicles (bus & coach and large goods vehicles).

BASIC STATISTICS²

The National Freight Demands Study in New Zealand,³ indicated that 92% of all freight by weight in New Zealand is moved by trucks with 6% by rail and 2% by sea. On a tonne-kilometre basis, the report found that trucks transported about 83% of domestic freight with 13% travelling by rail and 4% by sea. The contribution to national GDP is 3% (NZ\$5 billion annually).

The road transport industry operates about 22,500 trucks and directly employs 25,260 people which is about 3% of the fulltime workforce. The number of heavy trucks grew by 2.7% a year from 71,705 in 2004 to 79,539 in 2007. About 60% of the heavy vehicle fleet operates as a truck without a trailer and truck numbers have been growing faster than trailer numbers. However, it is the truck and trailer combinations that clocked up the largest proportional kilometre growth between 1997 and 2005. Two-axle trucks between 7-10 tonnes are the most common type of truck, but three-axle trucks between 16-20 tonnes travel the greatest distances. Trucks travelled 2,700 million kilometres in 2007, covering on average 34,000 kilometres a year. Between 1997 and 2007, truck travel grew by 3.5% a year. Typically, trucks cover three times the distance of other vehicles each year. Over 80% of road transport companies have five or fewer employees or trucks, and most are family owned. Most of the vehicles between 3.5 and 10 tonnes are used for carrying goods for people on their own

¹<http://www.transport.govt.nz/ourwork/climatechange/Documents/Report%20on%20fuel%20efficiency%20survey.pdf>

² The Road Transport Forum (RTF) in New Zealand produced a small booklet *Road Transport FACTS* published in 1998. An updated version has been compiled in 2009 by RTF but not yet published and information from the updates is used in this paper.

³ <http://www.transport.govt.nz/research/Pages/TheTotalCurrentFreightTask.aspx>

account and not by commercial carriers. Most commercial vehicles less than 4 tonnes are vans and utes. Heavy four-axle trucks can legally weigh up to 25.8 tonnes laden. Trucks and trailers, can weigh up to 44 tonnes and have three common configurations; articulated (tractor unit with a semi-trailer; B-Train (tractor unit with two semi-trailers); and Truck & Trailer (truck towing a multi-axle trailer).

MAIN FINDINGS

We report here on the fourth part the Ministry of Transport project, Improving Vehicle Fuel Efficiency Monitoring. The survey was undertaken against a background of the highest fuel prices ever recorded in New Zealand. The sample consisted of 300 datasets, which at varying stages of the analysis was reduced in size due to nil responses. The authors were not responsible for the sampling process, that being undertaken by the Ministry of Transport. It should be noted that with a sample size of 300 drivers and the restricted geographical disposition of the interview locations focussed on main freight arteries, results from our analysis can only be taken as indicative rather than statistically rigorous. However, much of the data was analysed in sample sizes that permitted robust analysis.

The key findings are that drivers are positive towards developing their skills (78.4%) and the majority (70.5%), care about the fuel efficiency of their company vehicles. Unsurprisingly an even greater number (86.1%) care about the fuel consumption of their personal vehicle. This positive attitude to fuel efficiency and skills development amongst drivers is most welcome and should be built upon by management.

It was also found that fuel consumption information tends not to be communicated to drivers. The majority of operators collect information but only a minority communicate individual or fleet performance to drivers and this is a barrier to culture change that should be removed.

Larger companies tend to collect more fuel consumption data, possibly influenced by the size of their annual fuel bill, and their drivers appear to be more caring about fuel efficiency. They also have more vehicles with in-cab displays (ICDs). Larger fleets tend to buy the new vehicles that have these electronic management systems installed as standard, but the filter down process to the smaller fleets that buy second-hand vehicles takes time.

With sufficient accurate fuel consumption data it becomes possible to devise a self financing fuel bonus scheme. Bonus payments to drivers for significant fuel savings that they achieve can be financed from a portion of the savings made in the company fuel account. However, to determine the impact of seasonality at least one year's data should be used in the calculations. Using a financial incentive to sustain the impact of a driver development programme can also be coupled with the annual payment of the bonus so it can also be used as a retention tool.

Many vehicle operators have doubts and misgivings about fuel bonus systems, which tend to manifest themselves in the complexity of such systems. However, by keeping such matters simple, effective and acceptable, systems can be developed (Coyle and Brown 2004).

Where sub-sectors are identified as being the best in a certain area, they should be investigated further to determine the key motivational and influencing factors and whether their best practice can be transferred to any of the other sub-sectors.

DRIVER SURVEY: METHODOLOGY

A sample of 300 drivers across a range of sub-sectors was interviewed at the roadside and their responses to a questionnaire recorded and later entered into a database for analysis. The principle method of investigation was to examine by sub-sector and where appropriate to cross tabulate the data.

It is a long held view by many in the industry that a driver who drives the same vehicle will take more care of the vehicle than a driver who switches between vehicles. There is therefore the possibility that a driver who drives the same vehicle might be more interested in fuel efficiency than one who moves between vehicles in a single shift or on some other basis and this had to be factored into this research. The nine sub sectors (Bus & Coach; Company Car/SUV; Contractors; Courier; Goods Service; Heavy Goods; Light Van/Ute; Light Vehicle and Taxi) were chosen by members of the research team and representatives from the Ministry of Transport and Land Transport New Zealand.

The fleet sizes consisted of:

- Less than 5;
- 5 – 20 and
- more than 20

Table 1 shows the sub-sectors and resulting sample sizes, which whilst not uniform provides sufficiently sized samples when divided into light and heavy vehicles.

Table 1 Sample size by sub-sector

SUB SECTOR	DRIVERS
Bus & Coach	29
Company Car / SUV	17
Contractors	8
Goods Service	29
Heavy Goods	73
Light Van / Ute	44
Light Vehicle	58
Taxi	42
Total	300

Note: There were two drivers from courier companies and one sub-sector was recorded as a blank. To prevent any skewing of the analysis these three drivers were allocated to the light vehicle group.

The sub-sectors that combine to make up the heavy vehicles are Bus & Coach, Contractors, Goods Service and Heavy Goods, which provide a total of 139 drivers (46.33% of the sample). The remaining drivers are all classified as light vehicle drivers. The research looked to determine a driver's own attitude and what they perceived to be the attitude of the company to fuel efficiency. Whilst subjective, it can be considered alongside the responses of operators to other parts of this project. Other attributes of a company that may influence a driver's attitude or perception are identified where possible.

A normal expectation is that a driver usually drives the same vehicle and this tends to hold true with the exception of the bus and coach drivers with only 48.3% normally driving the same vehicle because the nature of their work has them moving between vehicles on a daily basis. For the other groups, between 82% and 93% drove the same vehicle regularly.

Whether or not a respondent driver's propensity to drive the vehicle in which they were interviewed actually influences their attitude to fuel efficiency needed to be determined. The first stage was to identify each driver's attitude to the fuel efficiency of their own vehicle and again when driving a company vehicle. This was then followed by examining the respondent's attitude to the fuel consumption of the company vehicle that they drove. Finally, the two sets of data were combined in a larger cross tabulation to identify commonality and exception. It would be expected that drivers who care about the fuel consumption of the company vehicle would also care about the fuel consumption of their own personal vehicle and that some of the drivers who do not care about the company vehicle fuel consumption nevertheless may care about the fuel consumption of their own vehicle.

Our analysis revealed that a high proportion of drivers, 86.1% overall, do care about their own personal vehicle fuel consumption. The highest scoring were the drivers of heavy goods vehicles (95.7%) and the lowest were the light van/ute drivers (77.3%).

That some 70.5% of drivers cared about the fuel consumption of a company vehicle does indicate an attitude that management could build upon to improve fuel efficiency in the company fleet. This could be done through developing driver skills in safe and fuel efficient driving such as the SAFED⁴ program, and with motivational tools such as rewards for the safest and most fuel efficient drivers. Rewards could take the form of prizes, awards and fuel bonus payments.⁵

The data does support the view that drivers who care about the fuel consumption of the vehicle that they drive for their company also care about the fuel consumption of their own vehicles. However, this is not as sound an assumption as might have been expected. For example, in the light vehicle section, eight of the eleven drivers who did not care about the company vehicle fuel consumption did care about their own personal fuel consumption. Interestingly, in the same sub-sector, five of the 43 drivers who cared about the company fuel consumption did not care about their own personal

⁴ SAFED is the safe and fuel efficient driving programme developed at the Department of Transport and Logistics, University of Huddersfield in 2003. The NZ Ministry of Transport has indicated intent to adapt the SAFED programme for implementation in New Zealand. Brief information about SAFED is provided in Appendix A.

⁵ www.dft.gov.uk/pgr/freight/research/fuelbonusschemes?page=2

fuel consumption. Additionally, of the 287 drivers analysed only 22 (7.7%) did not care about fuel consumption whatsoever. The conclusion to be drawn from this is that the majority of drivers do care about their fuel consumption (both personal and company vehicle) and this could be built upon to develop a fuel efficiency culture that would benefit both companies and individual drivers.

The extent to which caring about how much fuel a company vehicle consumes is influenced by whether the driver normally drives the same vehicle was explored. Analysis of the data revealed that out of the 285 useable responses 84 (29.5%) did not care about the company vehicle's fuel consumption.

Further analyses of the data revealed that out of those 84 responses 62 (73.8%) were made by drivers who did not normally drive the vehicle. The conclusion to be drawn from this is that it appears to reinforce the view that drivers who have dedicated vehicles are more likely to care about *their* vehicle's fuel consumption and by logical association be more interested in and take more care of *their* vehicle. Such a hypothesis needs to be tested more rigorously.

The drivers were asked if they knew the fuel consumption of the vehicle that they were driving and this was followed up by two questions that would determine the accuracy of their response if they replied "yes". There were 289 useable responses to the initial question. Only 37% of respondents claimed to know the fuel consumption of the vehicle they were driving which, given the fact that a much larger number care about fuel consumption, does infer a communications gap between vehicle operators and their drivers.

The follow up questions, which asked drivers who had answered "yes" to state the fuel consumption in l per 100 km or the vehicle range on one tank of fuel, produced a wide range of answers. Examination of the answers suggests that only 35 (12.1%) of drivers actually replied with a figure that was likely to be accurate. For example, fuel consumption figures ranged from 1l per 100 km to 330l per 100 km and distances on one full tank of fuel ranged from 2 kilometres to 1,000 kilometres. This again reinforces the issue of management needing to communicate fuel consumption information to their drivers.

Once driver attitudes in general had been explored, the next stage was to determine the attitude of drivers to driver training which, to use more modern and appropriate language, is referred to as driver development, because people who drive for a living are unlikely to be receptive to the notion of undergoing driver training. Modern driver development programmes focus upon safety and fuel efficiency, but unless the driver has the right attitude, once the training is completed it will be ignored. Therefore, driver attitudes to skills development, need to be explored.

DRIVER SURVEY - ATTITUDES TO SKILLS DEVELOPMENT

Vehicle technology evolves due to the natural progress in general and legislative led changes to allowable emissions from the internal combustion engine. Driving techniques need to take these changes into account. However, it is important that drivers themselves buy-in to the concept of improving and updating their skills

through driver development programmes. It is not unreasonable to assume that professional drivers doubt that they need any further skills development, but that they could well think of other drivers who would benefit.

In order to establish driver views and by implication attitudes to driver development, a number of questions were asked. The 292 useable responses indicated that the majority of drivers believed that they would benefit from such skills development.

This is a highly positive and welcome response and whilst there is a large variation between the different sub-sectors it does indicate the potential buy-in from drivers for skills development. Before drawing conclusions from these data it is important to point out that the company car/SUV drivers that responded numbered only sixteen in total and so any single change in the responses carried much weight when viewed as a percentage – each observation had a weight of 6.25%. This also applied to the contractors where each response carried an even greater weight of 14.3%.

Heavier vehicles such as found in the bus and coach, contractors, goods services and heavy goods sectors will consume more fuel per kilometre than their lighter counterparts. Conceivably, company management in the heavy vehicle sector could have heightened interest for improved driving skills, both from individual drivers and, through awareness-raising. The less positive response to the question by drivers of company cars/SUVs (50%) and taxis (62.5%) does raise questions that should be investigated further.

It is generally accepted that one of the most effective forms of marketing is by personal recommendation from a friend or someone who has credibility with an individual. To this end the drivers were asked if they knew of other drivers who had received any driver development to improve their safety and fuel efficiency skills. Responses were then cross tabulated with the responses about knowledge of other drivers benefiting from driver development. Of 283 useable responses only 89 (31.4%) drivers who believed that they personally would benefit from driver development were aware of other drivers who had benefited. This suggests that drivers have a positive attitude to skills development and that this has not necessarily been influenced by the experience of other drivers.

No clear pattern reveals itself by sub-sector other than bus and coach was very high at 76.9% (20/26) and light van/ute was very low at 8.6% (3/35). Excluding the bus and coach drivers, this suggests that one or more other mechanisms have resulted in the high proportion of drivers who believe that they personally would benefit from driver skills development. Other than arising from a driver's own belief system, one logical assumption is that it has been brought about through something occurring in their work environment. This could be a company communication or training package that has raised awareness of the benefits of development of driving skills. It is reasonable to expect that most people who drive for a living (professional drivers) believe that they are "good" drivers, and that drivers other than themselves would benefit from driver development. This proposition was then put with the anticipation that there would be a highly positive response. The question was structured so that it asked about other professional drivers and not drivers in general.

The high response rate from the 289 useable replies reinforces the view expressed in the previous paragraph and raised the question as to whether or not drivers who benefit from such skills development could be used to promote such training to other drivers. Most of the drivers who believed that they would benefit, also believed that other drivers would benefit. This could open up a promotional opportunity. With the exception of the contractors, most of the drivers who did not believe that they would benefit from skills development believed that other drivers would.

A key element of any driver development programme is that a driver must have a positive experience and this can actually help in the marketing of a training programme. In the UK this approach was used to help market the SAFED programme the following quotes were made by two drivers after they had completed their SAFED course.⁶

“...SAFED has changed my ideas about how to drive my vehicle. I have learnt techniques that I would never have thought would work, but I have been proved wrong. It’s a totally different driving style but clearly one that works.”

Martin Carr, AHT Logistics.

“I thought that I was a good driver, but now I’m certain that I am driving better and more safely after going through the safe and fuel efficient driving (SAFED) programme – and I feel less stressed into the bargain.”

John Thompson, D W Weaver Group

A key element of the SAFED programme is that a ‘before’ and ‘after’ drive takes place so that a driver can experience in concrete terms the improvements as measured by fuel consumption, gear changes and journey time instead of just an appreciation of abstract concepts.

A review of this part of the analysis indicates that the drivers have a positive attitude to skills development and that this has not been influenced by their knowledge of the experiences of other drivers. There is a generally held view that drivers sell the concept of skills development to other drivers through their own positive experiences. In this case there appears to be a conundrum because a majority of drivers who believed that they would benefit from skills development did not know of other drivers who had undergone such training. Therefore, other factors must be at work, one of which could be the influence of a driver’s employer. Employers have a major role in forming driver’s perceptions of fuel efficiency and this was explored in our analysis.

DRIVER PERCEPTIONS

⁶ Source: Truck & Driver, April 2006 p10

A driver can be influenced by the environment in which he/she works: an environment set and to a large degree controlled by the company. The fuel efficiency culture as perceived by the driver can be influenced for example by:

- The collection of fuel consumption data;
- The dissemination of any fuel consumption information;
- Driving skills development; and
- Being involved in vehicle procurement decisions.

People and organisations tend to respond to the measures by which they are being judged and unless fuel consumption is being monitored and reported correctly then there is unlikely to be a fuel efficiency culture within a business.

Fuel monitoring (data collection, analysis and reporting) is the foundation stone upon which, fuel efficiency is built. The collection and reporting of fuel consumption data itself sends a signal to everyone in the organisation that fuel management is important and this forms part of the company culture. Drivers were therefore asked if their company collected information on fuel consumption.

Given the high cost of fuel at the time of the survey it is perhaps surprising that the overall percentage of companies that collect data was found to be low at 55%. However, the range from 79% (bus and coach) to 36% (taxi) suggests that there is a sub-sector specific variation. Taxi drivers usually drive their own vehicles and pay for their own fuel so it is surprising that they do not monitor their own fuel consumption. Contractors (38%) on the other hand operate a large range of equipment and can employ a large number of non-drivers so fuel costs are likely to represent a smaller proportion of overall business costs. To examine sub-sector variation more closely, drivers were asked if their company provided them with information on vehicle fuel consumption.

Again the bus and coach operators appeared to be the most progressive by providing information on specific vehicle fuel consumption to the driver or drivers of that vehicle with the taxi drivers being provided or providing themselves with the least information. When asked if their company provided them with information on fleet fuel consumption the number of positive responses reduced further. One reason for this is that fleet fuel consumption might be viewed as being commercially sensitive information only made available to directors and senior management.

Making available information on fuel consumption and acting upon the information is one way in which a fuel efficiency culture can be generated within a company. The drivers were asked if they thought that their company should provide them with that information. Overall 39.2% thought that their company should, with 31.9% “not bothered” and 28.8% answering “no”.

Although less than half of the drivers think that such information should be provided, they represent the largest of the three groups. The responses do appear to be sector sensitive with the bus and coach drivers being the most positive at 51.9% (14/27) and the taxi drivers being the lowest at 22% (9/41). Responses were little different for information on fleet fuel consumption.

Interestingly, sub-sector analysis reveals that the taxi drivers were more in favour of being given information on fleet fuel consumption than their own vehicle's fuel consumption, by the ratio of 14:1 to 9:1. On reflection it is more likely that vehicle operators will provide feedback on individual vehicles rather than reveal commercially sensitive information such as fleet fuel consumption. Therefore, an analysis of drivers who believe that the company should give them information on their vehicle and whether or not their company does could reveal an interesting opportunity for operators to develop a more fuel efficient culture. Analysis of the 284 useable responses made evident that there is such potential.

There is a large number of drivers who think that the company should provide them with information on their vehicle performance, but they are not provided with the information. For example, eight drivers of goods service vehicles thought that they should be provided with information on their vehicle's fuel consumption, but only three (37.5%) were actually given the information, whilst five (62.5%) were not given the information. Using the data exclusively associated with "goods vehicles", an analysis can be conducted to determine the potential for companies who do collect data to inform drivers who would like to be informed of their individual vehicle's fuel consumption.

This analysis showed that for the seven drivers who believed the company should provide fuel consumption information only five companies actually collected the data, for which only three drivers actually received the information. Obviously this sample size is very small but it infers that 40% (2/5) of drivers think that the company should provide them with feedback on their vehicle's fuel consumption, where the company does actually collect the data. Applying this methodology to all the sub-sectors provides the following information:

- Bus & Coach 16.7%
- Company Car/SUV 20%
- Contractors 0.0%
- Goods Service 40.0%
- Heavy Goods 17.2%
- Light Van/Ute 25.0%
- Light Vehicle 42.9%
- Taxi 57.1%

It can be deduced that there is a difference between the sub-sectors but because at this level of analysis the sample sizes are small, care must be taken when making inferences from the outputs. The overall analysis of driver perception suggests that there is probably an opportunity for operators to build upon driver interest in fuel consumption to build a fuel efficiency culture in the management of their fleets.

Another part of this research project involved face to face interviews with vehicle operators and included an exploration of fuel monitoring within companies. The resulting analysis suggested that the monitoring that did take place was financially based and not operationally motivated. There may be other attributes that influence a driver's perception, besides whether or not a company monitors its fuel consumption

and gives feedback to drivers on the fuel consumption of their vehicles. We examine below some of the data to identify if such attributes exist.

DRIVER SURVEY – VIEWS ON COMPANY ATTRIBUTES

There is the possibility that other company attributes can influence a driver's attitude to fuel efficiency. Since the driver questionnaire was limited in the range of data that could be collected and the drivers are not cross referenced with the parallel operator survey participants, no direct driver and company comparisons can be made. There are however a number of variables that can be examined. The first of these is fleet size and whether or not that influences tendencies to collect fuel consumption data. There were 240 useable responses (blanks and don't knows were removed).

Analysis of the data appears to show that as fleet size increases there is a greater tendency for fuel consumption data to be collected. This could be influenced by the overall size of the fuel bill. It may, however, be related to larger fleets containing more new vehicles that have in-built fuel monitoring technology, which encourages collection of fuel consumption data. With advances in engine management systems, modern vehicles now have menu driven in-cab displays (ICDs) that can provide the driver and vehicle owner with an array of useful information.

The data indicate that as fleets get larger they are more likely to have vehicles with ICDs. This might be because the owners of larger fleets can afford to buy the newer modern vehicles and the smaller fleets buy older second hand vehicles – possibly passed on from the larger fleets.

The drivers were also asked if their company had done anything to improve fuel efficiency in the past twelve months. The responses numbered by fleet size are shown below:

- Less than 5 34 (41.5%)
- 5- 20 31 (32.3%)
- More than 20 20 (27.8%)

This information shows that the smaller companies, as a proportion of the sample, are attempting more interventions to improve fuel efficiency, but without a robust monitoring system the two fundamental questions cannot be answered. These questions are:

- Does the intervention work – a mathematical question and
- If it works, is it financially viable – an economic question.

This does raise the possibility that the smaller operators are wasting resources by introducing interventions without an effective system of evaluation.

CONCLUSION

In conclusion, the analysis has found that most drivers do care about fuel consumption – more so the fuel consumption of their personal vehicles. Also, setting aside the bus

and coach sub-sector, drivers who normally drive the same vehicle are generally more likely to care about fuel consumption.

There is the potential for companies to develop a fuel efficiency culture by building upon the driver's interest in their vehicle's fuel consumption. This could be enabled through the collection and reporting on fuel consumption at the individual vehicle level rather than providing commercially sensitive fleet performance information.

To varying degrees, a majority of drivers had a positive view of skills development and unsurprisingly thought that other drivers would also benefit. Furthermore, only a minority of these drivers knew of other drivers who had undergone some form of driver development. This raises an opportunity in terms of marketing because the view is generally held that drivers who have a positive experience when undergoing driver development tell other drivers about their experience and in effect sell the training. A caveat to this is that the skills development package must be of a quality that drivers buy-in to it and have no hesitation in telling other drivers about their experience and resulting improvement in their driving knowledge and skill.

The bus and coach companies and their drivers appear to have a fuel efficiency culture more so than the other sub-sectors. Investigating why this is so could reveal attributes and other factors that might be transferable to the other sub-sectors.

Similarly, investigating all areas where sub-sectors show the highest levels of fuel efficiency should likewise be explored and where possible their best practices transferred to the other sub-sectors.

The larger the company the greater is the interest of their drivers in fuel efficiency. Also larger companies tend to monitor more than the smaller operators. This might be facilitated by the larger companies purchasing modern vehicles with inbuilt ICDs, which the smaller companies cannot afford.

Overall, the key factors are that the majority of drivers do care about fuel consumption and believe that they personally would benefit from driver skills development. These two factors offer great opportunities to advance fuel efficient driving behaviour.

REFERENCES

- Baas P. and Latto D. (2005), *Heavy Vehicle Efficiency*, Prepared for Energy Efficiency and Conservation Authority, Transport Engineering Research New Zealand, September.
- Baas P. Latto D. and Ludvigson T. (2005), *Light Vehicle Fleet – Energy Use*, Prepared for Energy Efficiency and Conservation Authority, Transport Engineering Research New Zealand, September.
- Coyle M. (1999), *Results of Huddersfield Fuel Efficiency Survey*, One day conference on improving vehicle fuel efficiency to reduce costs and environmental impact, 15th April, University of Huddersfield.

- Coyle, M. and Brown, S. (2004) *A scoping study into the potential for the application of a fuel bonus system for drivers in the road freight transport industry*, Department for Transport, London, March.
- DETR (1998a), *Attitudes to Fuel Efficiency: In UK commercial vehicle fleets*. London, HMSO.
- DETR (1998b), *Attitudes to Fuel Efficiency: In UK car and van fleets*. London, HMSO.
- ECG 59 (1996), *Fuel Consumption in Freight Haulage Fleets*. Energy Consumption Guide 59 Department of the Environment, London, HMSO February.
- Ratcliffe B. (1980), *Fuel Conservation: Much talk but not a lot of action*, Transport, July/August, pp 55-56.

APPENDIX A - SAFED

The safe and fuel efficient driving (SAFED) programme was developed for the UK's Department for Transport (DfT) by the Department of Logistics and Transport at the University of Huddersfield. The research project was led by Dr Michael Coyle and written by John Boocock. The pilot programme indicated that substantial savings could be achieved and the first full SAFED programme funded by the DfT saw 375 SAFED instructors and 6,000 drivers trained.

The programme consists of the driver undergoing a pre instruction drive, a classroom based education and instruction process and then a post instruction drive. In order to show the impact of the SAFED techniques and methods and dispel unfounded rumours that economic driving is slow driving three key metrics (fuel consumption, number of gear changes and time taken to complete a route) are monitored.

The results of this first programme were:

- 10% improvement in fuel consumption
- 37% reduction in gear changes
- No change in driving time

SAFED was designed so that it could be adapted for use by drivers of, cars, vans, buses, coaches and the full range large commercial vehicles. It has been used in three separately DfT funded programmes and forms the basis of a number of company specific driver training programmes. It is estimated that to date over 500 instructors have been trained and more than 10,000 drivers have successfully completed the programme.

In the UK the SAFED programme has been positively received by drivers and managers alike, whilst vehicle operators outside the UK have expressed an interest in developing it to meet their own operational requirements.