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THE EXTENT TO WHICH HEAVY GOODS VEHICLE DRIVER TRAINING IS FOCUSED ON REDUCING THE CASUAL FACTORS OF DRIVER STRESS AND FATIGUE

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Introduction

United Kingdom (UK) government and European Commission (EC) statistics identify driver stress and fatigue as a major cause of road accidents, with research showing that driver fatigue is a significant factor in approximately 20% of accidents involving heavy goods vehicles (HGVs).

Over the last 25 years, HGV drivers have benefitted from increased investment in training programmes, with a considerable widening of the scope of training and greater emphasis placed on legal compliance and cost reduction. A recent European Union Council Directive requires that HGV drivers undertake a minimum of 35 hours training over a five year period.

Whilst there appears to be considerable industry produced material expounding the benefits of training, critical academic and analytical information is scarce and the effectiveness of HGV driver training as a measure to improve road safety is the subject of ongoing debate.

Academic literature identifies the causal factors leading to increased stress and fatigue while driving, however, the extent to which HGV driver training is focused on stress and fatigue is unclear from the literature. This research is intended to contribute to understanding of this area.

Research Aim

The aim of this research is to determine the extent to which vocational driver training programmes are aligned with academic research, in that they recognise the main causal factors of workplace stress and fatigue, the behaviours that this drives and the impact that this can have on road safety.

In essence there are six fundamental questions being asked through the research:

- 1) Is stress and fatigue a major cause of work-related collisions?
- 2) Has academic research identified conclusive evidence of causal factors of driver stress and fatigue?
- 3) Are HGV drivers aware of stress and fatigue causal factors?
- 4) Do HGV drivers believe that the training on stress and fatigue is appropriate and adequate?
- 5) Is vocational HGV driver training aligned with the findings of academic research?
- 6) Will enhanced HGV driver training on stress and fatigue causal factors improve road safety?

Background

Department for Transport (DfT) statistics show that in 2010 accidents involving at least one HGV totalled 7,103 with 9,686 casualties, of these 263 were fatalities (DfT, 2011). European Road Safety Observatory (2011) statistics show that across the 24 EU countries in 2009 more than 4200 people died in road traffic accidents involving HGV's.

Research by Broughton et al (2003) suggests that drivers who drive more than 80% of their annual mileage on work-related journeys had approximately 53% more collisions than similar drivers who had no-work related annual mileage. In 2011 the road safety charity Brake in conjunction with Direct Line conducted three surveys that encompassed 2539 at-work drivers, the survey found that 61% of at-

work drivers admitted driving while not concentrating because they felt stressed, annoyed, or upset at the behaviour of other road users (Brake, 2011).

The European Transport Safety Council (ETSC) (2001) indicate that truck driver fatigue is a significant factor in approximately 20% of heavy goods vehicle accidents. Hamelin (2000) points out that various surveys carried out at different times, show that over 50% of long-haul drivers have at some time fallen asleep at the wheel. There is consensus amongst governments, researchers and industry bodies such as the Road Haulage Association and Freight Transport Association that driver fatigue is a major cause of road accidents.

Fatigue and stress are notoriously difficult to define and are broadly used to refer to a wide range of driver states. Contemporary research defines fatigue as a transient state with difficulties in maintaining task-directed effort and attention during sustained performance (Brown, 1994). Lazarus (1966) suggests that an event that is interpreted as undesirable or taxing on personal resources may result in psychological stress, whilst Kanner et al (1981) indicate that much of the stress encountered by an individual is a product of the continuous bombardment of common daily hassles, such as time pressures, job concerns or everyday pressures.

Further review of literature establishes conclusive evidence of the causal factors of driver stress and fatigue. Poor job design, high workload, long work hours and long hours of monotonous tasks have been identified as causes of driver stress and fatigue. Smiley & Brookhuis (1987) indicate that at least 90% of the causes of accidents can be traced to the driver, they observe that a significant proportion of accidents are caused by or are at least related to inadequate mental workload. It is suggested that when the mental workload is either too low (vigilance) or too high (stress) it can lead to imperfect perception, insufficient attention and inadequate information processing.

Brookhuis & Waard (2008) propose that the sense of fatigue or drowsiness at the low end of workload, and stress at the high end of workload can be related to the cause of accidents. Bahar et al (2009) conclude in their study that professional drivers are more prone to experience stress caused by the difficulties of driving for long periods in traffic, and that as a result the probability that they will reflect this stress in terms of aggression is high. Other studies support this view and suggest that professional drivers are at a high risk of being involved in road traffic accidents due to their high annual mileage, furthermore professional drivers have work-related issues to deal with that are likely to increase driver stress and exposure to risk (Dorn & Brown, 2003).

Traditionally, professional transport and logistics companies have developed driver training & health and safety programmes to increase driver awareness and improve driving standards. Driver training legislation has not been prescriptive about the training details and leaves companies to develop their own approach to training methods and programme content. This approach means that the 'quality & content' of driver training programmes differ from company to company.

In an attempt to harmonise legislation and improve road safety, the EC introduced Directive 2003/59/EC which became effective in the UK in September 2009. Under the Directive, drivers of goods vehicles over 7.49 tonnes must attain a 'Driver Certificate of Professional Competence' (DCPC). The legislation requires these drivers to complete 35 hours of approved training in each five year period, and the training must be given in periods of not less than 7 hours. The legislation is not prescriptive about the training details and only outlines requirements under the following headings:

- 1) Advanced training in driving based on safety regulations.
- 2) The application of regulations.
- 3) Health, road and environment safety, service, logistics.

The key concern with this approach is that important safety issues may not be addressed. Research suggests that driver stress and fatigue can have a significant impact on road safety, but the legislation does not specifically target this problem.

Research Methodology

This research is based on qualitative information drawn from primary and secondary sources. In addition to academic material, secondary information has been accessed from the following sources:

- a) **Government & European Bodies** – Department for Transport (DfT), Department for the Environment, Transport & the Regions (DETR), Health & Safety Executive (HSE), Driving Standards Agency (DSA), European Transport Safety Council (ETSC), Vehicle and Operator Services Agency (VOSA).
- b) **Charities** – The Royal Society for the Prevention of Accidents (RoSPA), Brake.
- c) **Industry Associations** – Chartered Institute of Logistics & Transport, Freight Transport Association (FTA), Road Haulage Association (RHA).

Primary data was gathered from industry personnel drawn from three different third party logistics providers. Roles, data collection method and sample sizes are summarised below.

- a) **HGV Drivers** – A total of 70 HGV drivers from three different companies completed a driver questionnaire, administered on a face-to-face basis.
- b) **General Managers** – A total of five general managers took part in a semi-structured interview on a one-to-one basis.
- c) **Health & Safety Managers** – A total of one divisional & three operational Health & Safety Managers took part in a focus group interview.
- d) **Health, Safety and Training Development Manager** – This individual was interviewed on a one-to-one basis using a semi-structured approach.

The focus group interview of Health & Safety Managers concentrated on driver stress and fatigue and current training methods. Participants in the focus group were selected based on their knowledge and experience of safety and training, the debate was driven through a list of predetermined questions.

Findings

Driver Questionnaire Findings

The driver survey was deployed to ascertain if drivers were demonstrating behaviours that have been identified in the literature as causal factors of stress and fatigue, and to test their knowledge and understanding of those causal factors. It was also used to explore each driver's experience of current driver training programmes, and to gauge their opinion on the training that they have received in the area of stress & fatigue, and the impact on road safety.

The driver questionnaire consisted of three sections, each covering a specific theme; driving behaviour; causal factors of stress and fatigue; and; experience and adequacy of training. Drivers were asked to respond to a number of statements using a five category "Likert" rating scale to measure how much the respondent agrees or disagrees with the statements. After the data collection, the "Agree & Strongly Agree" responses were analysed, considering the correlation between the driver's behaviours and stress & fatigue causal factors. Figure 1 displays the percentage of drivers that either agreed or strongly agreed with each statement for the behaviour, causal factor and training categories.

The combined results indicate that a large percentage of the drivers demonstrate behaviours recognised as causal factors of stress & fatigue, it is also clear that a significant proportion have identified those behaviours as being causal factors. 41% of drivers reveal that they daydream on long journeys with 51% of drivers indicating that they recognise this as a causal factor of fatigue. This pattern continues, 71% of drivers recognise that sleep patterns and 73% that irregular hours of work are causal factors of stress & fatigue, however 36% state that they don't get enough sleep and 60% testify to working long hours. Furthermore 34% of respondents affirm that they lose their tempers when other drivers do silly things, whilst 49% identified this as a causal factor.

When asked if the induction training they had received included information or instruction on stress and fatigue 30% specified that it did, when asked if they thought that the training was adequate 20% specified that it was. Only 26% of the respondents believed that the training in this area is adequate with 59% declaring that driver training in this area is appropriate. 76% of respondents believe that enhanced training will correct their driving behaviours and improve their ability to identify and cope with problems associated with stress & fatigue. In total 74% of drivers interviewed agreed that enhanced training on stress & fatigue causal factors would improve road safety.

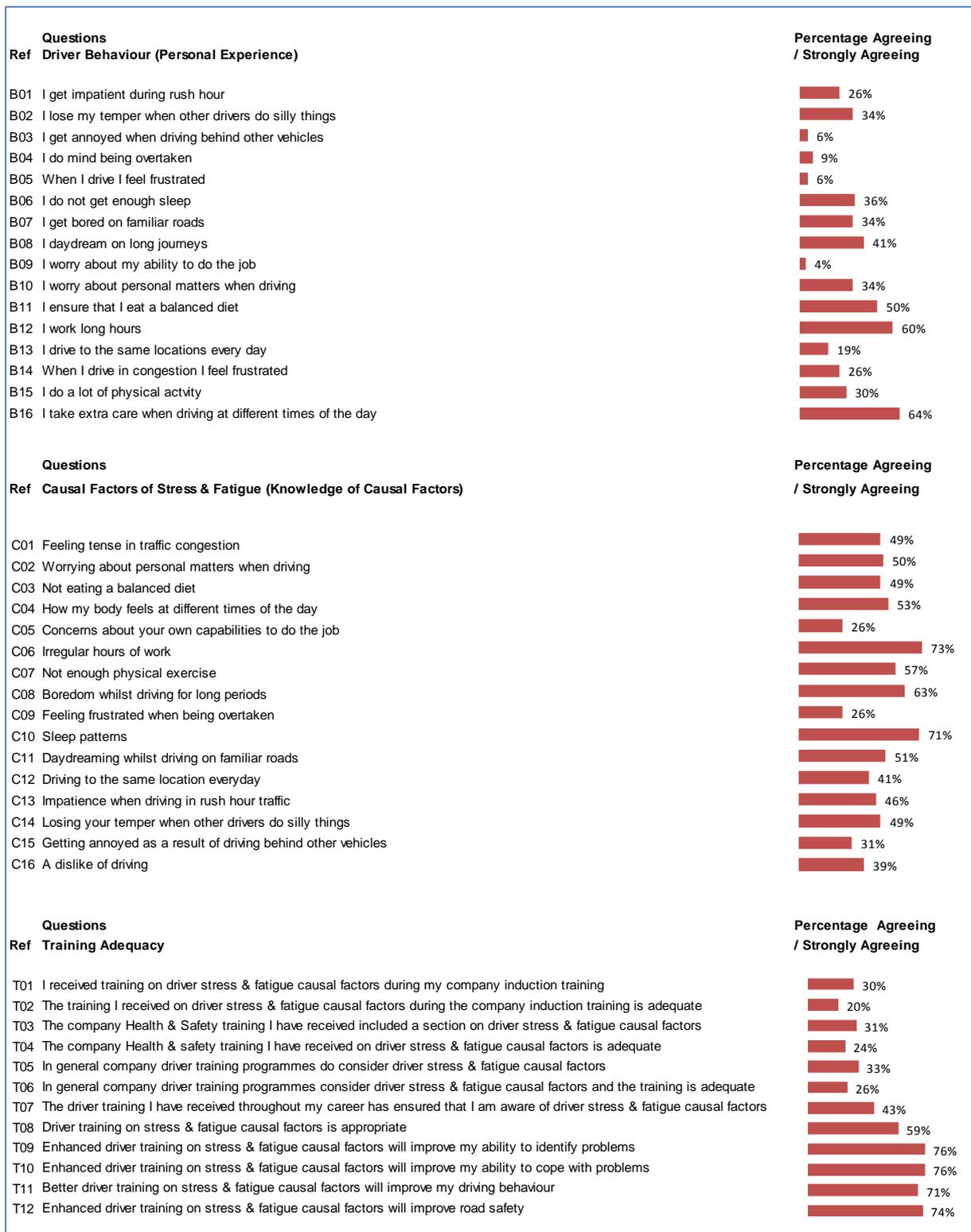


Figure 1: Driver Questionnaire Results

Focus Group / Interview Findings

One of the key questions being asked in this study is whether or not vocational HGV driver training is aligned with the findings of academic research. Through the semi-structured interview process and focus group, the researcher wished to ascertain the following:

- 1) Are the senior management teams aware of stress and fatigue causal factors?
- 2) Are the driver training programmes that they currently have responsibility for, or have previously been responsible for aligned with the academic findings on driver stress and fatigue?
- 3) Do they believe that enhanced training on driver stress and fatigue causal factors will improve road safety?

The Health & Safety (H&S) and Training (TRG) personnel identified a wide range of causal factors including, congestion, sleep patterns, night working, lifestyle and aggressive driving styles and behaviour, while knowledge of causal factors amongst General Managers (GMs) was more limited.

One of the five GMs interviewed stated that they had no knowledge of the causal factors of stress and fatigue. Four of the five identified congestion as a factor, while two raised hours of work issues such as length of day, irregular shift patterns, daily rest periods and night time working. One raised individual lifestyles and another task monotony and legislation and policing. Of the five GMs, two had recent experience of road traffic accidents within fleets under their control where the recorded causes were 'driver falling asleep at wheel' or 'driver fatigue'.

When asked what the key objectives are for their current individual HGV driver training programmes, the operational GM's, H&S and TRG managers identified the following key objectives:

- a) Cost reduction through improved fuel consumption.
- b) Cost reduction through a reduction in vehicle damage costs.
- c) Company & legislation compliance.
- d) Minimise company risks and claims.
- e) Personal safety.

During the interview process all participants were provided with examples of academic research and government statistics relating to HGV driver stress and fatigue, all of the participants including the TRG and H&S specialists were surprised by the information and data. The reasons for this lack of awareness and knowledge were discussed, with the H&S focus group suggesting that people do not report issues where stress or fatigue are factors due it being seen as "a sign of weakness". The H&S focus group also pointed out that the company and individuals do not like to "discuss stress and fatigue openly". The H&S focus group observed that 'stress and fatigue' counsellors are employed but that "the availability of this resource is not publicised" and that this resource is used reactively to an event and not proactively. This theory was supported by one of the GMs who believed that "there is a reluctance to discuss stress and fatigue due to the claim culture in the UK".

When asked if they would be developing their current training programmes to include causal factor identification and the impact that this can have on driver behaviour, all personnel involved stated that they would. The consensus amongst the managerial participants was that there was a gap in their current programmes, and that if this gap was closed it would help to improve road safety. Furthermore they all indicated that for future development of driver training programmes, they would look to align their training programmes with academic research on stress & fatigue.

Discussion

The indication is that a significant number of the drivers that participated in this exercise do not believe that that the training they have received in this area is adequate. When asked if enhanced training in this area would improve their abilities to cope, identify problems and improve their driving behaviours, responses indicate a high percentage of drivers believe that enhanced training would benefit them in all of the areas highlighted. More importantly 74% of drivers stated that they believed that enhanced training on stress and fatigue causal factors will improve road safety. The study highlighted the fact that the HGV drivers who have participated in this research have a reasonable understanding of stress and fatigue causal factors but they do not necessarily use this knowledge to improve or change their behaviours.

However, some researchers do not agree with the assumption that enhanced training will improve their overall behaviours and ultimately improve road safety. Palmer (1995) argues that improving the knowledge or skills of drivers does not always lead to a change in behaviour. Christie (2001) agrees with this and suggests that advocating training as a means of improving driving skills and knowledge, assumes that there are deficiencies in the skills and knowledge of drivers and that these can be

remedied by the application of training. A key point that both Palmer (1995) and Christie (2001) make, is that once the training is complete the company has little control over the post-course behaviour of drivers where their motivation to apply what has been taught may not be high. It could be reasonably argued that the reason that the driver behaviours do not reflect their understanding of causal factors, is simply that they are not motivated to change their behaviours. Although the debate about the benefits of driver training will continue, the key findings of this research and ultimately what is important is that the HGV drivers believe that the current training is inadequate, and feel that enhanced training in this area will improve road safety.

When comparing the driver results with those of the senior managers' findings, a number of themes develop. Although as a whole the senior managers had a good understanding of the causal factors of stress and fatigue, they indicated that driver stress and fatigue was not covered as an element of their current HGV driver training programmes. One of the main concerns that prevented the senior managers developing their programmes to include stress and fatigue, was that they believed that the drivers would use their improved knowledge as an excuse for poor performance, and suggested that it would increase personal claims against the company. By confirming that stress and fatigue are not covered the managers have made it easy to understand why the drivers believe that the training is inadequate.

The driver study has shown that the HGV drivers participating in this research have a good understanding of stress and fatigue causal factors, irrespective of the lack of training and information provided by the company. However, none of the managers participating in the research stated categorically that they had serious problems through drivers claiming to be stressed or fatigued and raising claims against the companies involved. As a result it could be argued that the senior managers' perceptions and concerns about increasing their drivers' knowledge in this area, and the belief that the claim culture within the UK is making it difficult to address this problem are unfounded. On the other hand it may be that the reluctance by the companies to discuss this issue openly is driving a "denial" culture within the driving force, thus reducing the instances where stress or fatigue are reported as causal factors of road traffic accidents. Once again this is difficult to reconcile. As discussed earlier a significant number of drivers have stated that they work long hours and do not get enough sleep, according to research these issues have been identified as significant causal factors of stress and fatigue.

Whilst this does not provide concrete evidence that drivers are suffering from stress or fatigue, it does confirm that there are a significant number of drivers who are currently adopting behaviour patterns that have been identified as causal factors of stress and fatigue. It is evident that current HGV driver training programmes adopted by the participating companies do not consider stress and fatigue, and are not aligned with the findings of academic research. The information gathered through this research suggests that the main objective of the current programmes is to reduce costs and ensure legal compliance. Vehicle checks, driver's hours, damage reduction and fuel consumption improvements appear to be the key elements. It is argued that ensuring vehicles are roadworthy and have regular inspections does improve road safety, it is also argued that by ensuring that drivers remain within the legal working time and driving time limits you can further improve road safety. However, the two factors not considered to a large extent are the drivers and their behaviour patterns and the on road environment that they face each time they arrive for work. The failure to include these critical elements suggests that there is a considerable gap in this approach with respect to improving road safety.

The introduction of the DCPC under the EU Directive 2003/59 was given a mixed response by the senior managers. Whilst the H&S and TRG managers generally agreed that it was a good thing, the operational GMs aired their concerns about the Directive's approach to course content. The GMs argued that the fact that it is not prescriptive about the content means that it has failed in one of its original key objectives, which was to standardise driver training across EU countries. A further concern was around the costs, as all of the HGV drivers employed by these companies must receive the 35 hours of training over 5 years as dictated by the Directive. A number of the GMs suggested that 'on-road' elements of the current training programmes could be reduced and the associated funds allocated to 'classroom' only DCPC training as a result. Furthermore the study established that none of the year one DCPC training programmes developed by the participating companies had a section on stress and fatigue as a component of the training.

Although the concept of the DCPC was developed over many years before introduction, it appears that the industry and the governing bodies have missed an opportunity to align the training with current

academic research into road safety. According to the GMs interviewed, the focus of the DCPC training programmes continues to be cost reduction and legal compliance. It is doubtful if this 'more of the same' approach will further improve road safety, as it does not attempt to improve driver behaviours with regards to stress and fatigue causal factors. The findings of this study suggest that there is scepticism amongst senior operational professionals about the real value of this Directive in its effectiveness in improving road safety.

Overall the study has shown that there is a belief and agreement amongst senior managers, H&S managers, TRG managers and HGV drivers that enhanced training in stress and fatigue causal factors will enhance road safety.

Conclusion

The findings of this study clearly demonstrate that current HGV driver training programmes are not aligned with academic research on stress and fatigue. Furthermore there is debate amongst academics and researchers on the effect that driver training has on the reduction of road traffic accidents, indeed there appears to be limited critical analysis of HGV driver training programmes by either academic or government researchers. The results of this study suggest that companies are using the HGV driver training programmes to reduce their own costs through driver efficiency initiatives, and ignoring the impact that driver behaviour patterns can have on road safety. It could be argued that this is a mere "oversight" by the companies, however indications from the interview outputs are that companies are reluctant to increase driver awareness of stress and fatigue due to concerns around increasing driver claims.

On the one hand, companies are striving to improve efficiencies and ultimately workplace safety, but do not appear to have a real strategy on how to deliver improvements in the area of stress and fatigue. It is evident from this study that all participants agree and believe that enhanced HGV driver training in stress and fatigue causal factors will improve road safety. This research does not provide statistical evidence to establish if enhanced training will improve road safety, although it does suggest that all of the participants are aware that there is a gap in the current thinking around HGV driver training programmes, and that they believe that closing this gap will deliver improvements in road safety.

Whilst HGV driver training may form part of the solution, consideration must also be given to altering organisational and work structures that may be shaping driver attitudes and behaviours. Although quality training programmes should be developed to include elements on stress and fatigue, work patterns and daily tasks should be reviewed on a regular basis. Risk assessments should be completed for tasks that are identified as being "monotonous" and driver start and finish times should be monitored to ensure daily and weekly rest periods are not only in line with legislation but are adequate.

The results show that irrespective of the lack of training content on stress and fatigue, HGV drivers do have significant knowledge of stress and fatigue causal factors. Part of the problem appears to be driver attitudes, although they have the knowledge they quite often ignore that knowledge. If the companies are to deliver consistent improvements in road safety it is essential that driver attitudes and behaviours are addressed.

Future studies should consider the effect that HGV driver training programmes have on driver attitudes and behaviours. The introduction of EU Directive 2003/59 has forced companies to provide a fixed number hours of training for every driver they employ, but its introduction has not resolved the debate as to whether training is delivering higher levels of road safety. One of the main problems is that it is difficult to measure or monitor driver attitudes and behaviour once the training has been completed. It could be argued that until these areas can be monitored and measured effectively, companies cannot be truly confident that their programmes are delivering improvements in road safety.

Research Impact

This research has implications for the development of HGV driver training programmes, for the field of stress & fatigue research, and for the debate on the impact that current training programmes have on road safety.

Practical Impact

The findings from this research have been used by a global logistics company to develop a driver awareness campaign and to incorporate a section on stress & fatigue causal factors in to their driver CPC training programme. In addition, investigations into road traffic accidents were enhanced as stress & fatigue causal factor questions were introduced in to the investigation process. Other companies could similarly make use of this research.

References

- Bahar, Ö., Türker, Ö., & Timo, L. (2009)'Professional and non-professional drivers stress reactions and risky driving' *Transportation Research, F*, (13), pp. 32 - 40.
- Brake (2011) *At-work Drivers*, report 8. London : Brake
- Brookhuis, A.K., & Waard, D.D. (2008) 'Monitoring drivers mental workload in driving simulators using physiological measures', *Accident Analysis and Prevention*, 42, (2008), pp. 898 - 903.
- Broughton, J., Baughan, C., Pearce, L., Smith, L., & Buckle, G., (2003) 'Work-related road accidents', *TRL Report 582*.
- Brown, I.D. (1994) *Driver fatigue*. *Human Factors*, 36, 298 – 314.
- Christie, R. (2001) 'The effectiveness of driver training as a road safety measure : A review of the literature', *Royal Automobile Club of Victoria, Victoria : RACV Ltd*.
- DfT [Department for Transport] (2011) *Road accidents involving HGVs: Road freight economic, environmental and safety statistics 20*. London : DFT.
- Dorn, L., & Brown, B. (2003) 'Making sense of invulnerability in a qualitative study of police driver' *Safety Science*, 41, (10), pp. 837 - 859.
- *Driving Standards Agency (2005) Driver CPC Directive*. London : DSA.
- *European Road Safety Observatory (2011) Traffic Safety Basic Facts : Heavy Goods Vehicle & Buses*. Brussels : European Commission.
- *European Transport Safety Council (2001) Driver Fatigue Working Party*. Brussels : ETSC
- Hamelin, P. (2000) *The working time of professional drivers as a factor of flexibility and competitiveness in road haulage and passenger transport*. In: *Working without limits ?*. Re-organising work and reconsidering workers health. TUTB-SALTSA Conference, September 25-27, 2000. Brussels, Belgium.
- Kanner, A.D., Coyne, J.C., Schaefer, C., Lazarus, R.S. (1981) *Comparison of two modes of stress measurement: daily hassles and uplifts versus major life events*. *J behave Med* (4), pp. 1 – 39.
- Lazarus, R.S. (1966) *Psychological stress and the coping process*. New York : McGraw-Hill.
- Palmer, J.W. (1995)'The effectiveness of driver training as a road safety measure, 4, (1),pp. 1 - 6.
- Smiley, A. & Brookhuis, A.K. (1987) 'Alcohol, Drugs and Traffic Safety' *Road Users and Traffic Safety*, 5, pp. 83 - 105.