

Work-related road safety: good practice cases from around the world

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Abstract

All over the world, work-related road safety has grown in importance in recent years as the extent of the problem has emerged, and an increasing number of researchers, practitioners and government agencies have seen its potential for protecting human, physical and financial assets.

Despite this increasing interest in occupational road safety (often called fleet safety), there are few published case studies of successful organisations. The aim of the paper is to start the process of addressing this research gap, by reviewing research and describing three successful case studies from around the world.

As well as the cases studies, the discussion focuses on the DNA (fundamental building blocks) of successful organisations, and the lessons they offer for road safety researchers, policy makers and industry.

Key words

Fleet safety, work-related road safety, occupational road safety, successful case studies

1 Introduction

Occupational road safety is an emerging issue, of significance for both road and occupational safety in many countries [Murray & Pratt 2007, McNoe et al 2005, Charbotel et al 2001 and Wills 2007]. In one of the most comprehensive Australian studies, based on a literature review, interviews with government and corporate representatives and a review of the occupational health and safety legal perspective, Haworth et al [2000] recommended the following fleet safety improvement interventions:

- Application of incident data monitoring systems to identify the magnitude of the safety problem.
- Tailor programs to vehicle types and usage in the organisation.
- Management interest, leadership and support.
- Selecting safe vehicles.
- Some particular driver training and education programs.
- Incentives (not rewards).
- Linking fleet safety to general OHS, quality management and company safety culture.
- Detailed program evaluation.

Despite such recommendations and an increasing body of research, Haworth et al and many other researchers since [eg Stuckey et al 2007, Murray et al 2009a] have identified that, with the possible exception of Salminen [2005, 2008] and Murray et al [2009b], there are no recent well-evaluated, peer-reviewed case studies identifying the DNA (or fundamental building blocks) of organisations that have effectively managed their occupational road safety. Most researchers still cite and base recommendations on the Swedish Televerket study [Gregersen et al 1996] undertaken in the mid 1980s.

The aim of this paper is therefore to help close an important gap in the research literature, by developing and evaluating an effective process for improving occupational road safety. This is addressed by describing separate case studies of three pharmaceutical companies from around the globe, all of whom have invested time and resources in road safety over recent years. The following sections describe each case in turn, leading into discussion of a management-led approach to improving occupational road safety. Finally, the paper seeks to identify some lessons learned for other organisations, researchers and policy makers in Australia and worldwide.

2 Case 1 – Pharmaceuticals Company, Australia

Case 1 is an Australian pharmaceutical manufacturer and distributor, part of a wider global Company based in Switzerland. In Australia, the company aims to create a safe driving culture for its 650 staff by promoting heightened awareness and responsible driving behaviours for all employees, to prevent vehicle collisions, reduce personal injury and minimise property loss claims [White & Murray 2007].

Four key elements of its fleet risk management program, undertaken with support from its insurer Zurich Australia, are described.

1. Implementation of online driver risk assessment and improvement for all existing staff and new employees.
2. Policy development.
3. Communications program.
4. Online program enhancements.

Since starting the program in January 2005, the company has successfully **implemented online driver risk assessment and improvement** modules, called RoadRISK: Profile and Defensive Driving, One More Second and RoadSKILLS and an online management information system (MIS) that supports these tools (Figure 1). RoadRISK is a 90-100 question web-based risk assessment of driver attitude, hazard perception, behaviour, knowledge and exposure, which has evolved globally over the last 10 years through experience with over 1,000,000 drivers and university-based research [Rea et al 2004, Darby et al 2009]. One More Second and RoadSKILLS are computer-based training modules that focus on driver attitude, defensive driving and specific scenarios such as city, country highway and general driving.

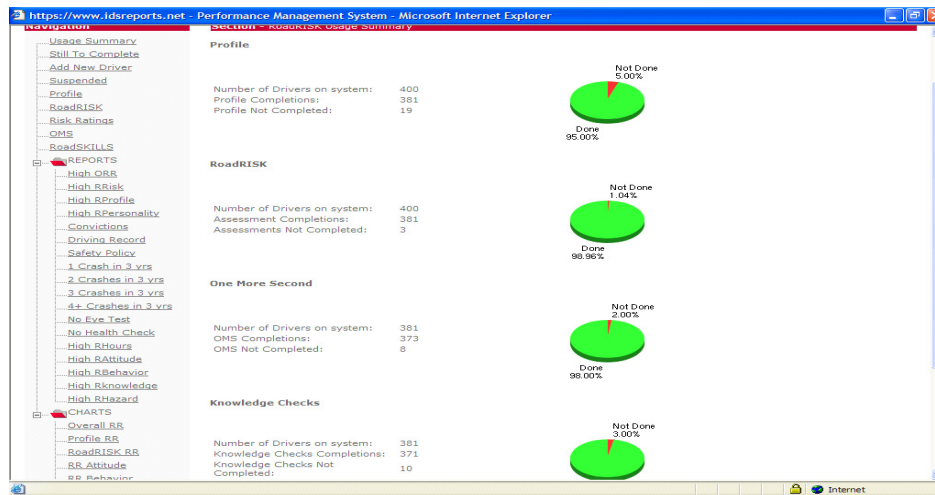


Figure 1 – Case 1 sample driver risk assessment program online management information system

This web-based approach enabled the company to carry out risk assessments, and to monitor and improve the safety of all its employees. The company also took the opportunity to roll out its **Vehicle Safety Policy** and **Driver Licence Checks** as part of the online program, allowing an integrated process for driver risk assessment, monitoring and improvement. In total, the process involves about four hours worth of online material for each driver, broken into the four separate modules described. The company achieved almost 100% compliance on each module for existing staff (Figure 1). New recruits undertake the program soon after joining the organisation as part of their extended induction.

According to the company's fleet manager, the initiative was effective immediately - generating discussion in corridors, over morning teas and at question times. The company analysed and targeted high, medium and low risk business processes and at the individual employee level. The outcomes provided both short- and long-term objectives, which were addressed by working closely with insurer Zurich and internal teams such as Health, Safety and Human Resources.

As an example, one of the RoadRISK questions is 'Have you had an eyesight test within the last 12 months?' Over 25% of employees answered 'NO'. This was drawn to the attention of the HR department, who subsequently offered free eyesight tests to all employees – whether entitled to a company vehicle or not. In total, 138 employees took the opportunity to have their eyes tested, 64 required further examination and 28 required glasses. This is now an annual assessment process for all employees.

At the same time, the company also developed, implemented, monitored and **improved its policies, procedures, processes, driver manual and on-going communications** including initiatives on collision reporting and investigation, anti-lock brakes, speed, seatbelts, alcohol, fatigue, holiday driving, back pain, journey management to minimise employee kilometres, vehicle checks and driving whilst pregnant.

Overall, the program has improved safety based on both proactive and reactive indicators, and has been externally recognised.

One of the key reasons for adopting the approach recommended by Zurich was the availability of extensive university and industry-based proactive **evaluation data** [Rea et al 2004, Darby et al 2009]. Using data from the first 422 of its drivers to complete the RoadRISK module a clear correlation between the assessment outcomes and driver crash history was identified (Figure 2).

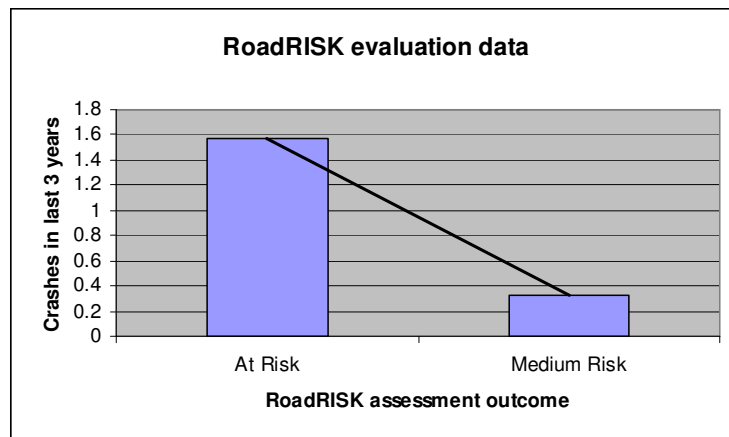


Figure 2 – Case 1 risk assessment outcomes compared to collision history

The ultimate **reactive** measure of the success of a program is in relation to road safety outcomes. Based on data provided by Zurich’s insurance underwriters, Case 1 reduced all its major collision types (Figure 3), improved its loss ratio from 69% to 48% and cut its premium costs by 35%.

| Description | Difference between 2003 and 2007 |
|----------------------------|----------------------------------|
| Failed to yield | 30% reduction |
| Hit Stationery object | 35% reduction |
| Hit in rear by Third Party | 20% reduction |
| Hit Third Party in Rear | 40% reduction |
| Reversing | 75% reduction |

Figure 3 – Case 1 collision reductions by type (Source: Zurich Australia)

The program has gained external recognition, and was the first Australian organisation to be recognised by the Fleet Safety Forum Awards, hosted by the UK-based road safety charity Brake, being Highly Commended in both the Road Risk Manager of the Year and Company Driver Safety awards in 2007. The company also won the Australian Fleet Managers Association (AfMA) Safety Award in 2007.

Key success factors for the project were seen as:

- Systems-based approach, led by fleet manager working closely with insurer.
- Application of online technology to fleet safety in Australia.
- Research-led approach based on independent evaluations and own internal data.
- Management information system (MIS) allowing data visibility, with results easily centralised, analysed and actioned.

- MIS developed to include own policies, licence checks and methodology to effectively risk manage starters and leavers.
- Highly cost effective - by targeting most risky areas in a standardised way, allowing employees to receive a large element of their recruitment, induction, risk assessment and corrective training before they and their trainers are exposed to the risks of the road.
- Not tied to expensive and poorly targeted in-vehicle driver skills based interventions.

Despite the successes to date, the company is working on steps to:

- Sustain and maximise the use of driver risk assessment for all existing employees and new starters.
- Reinforce Corporate Policy, including its newly revised mobile phone, vehicle selection and grey fleet management policies.
- Design and implement new online modules, including a Safe Driving Pledge, policy assessment, new RoadRISK Profile, RiskCOACH training modules on specific issues, bespoke Key Performance Indicators and collision analysis.
- Engage in external programs such as benchmarking and road safety outreach through good practice case studies to help other organisations learn from its initiatives.

3. Case 2 – Pharmaceuticals Company, USA

Case 2 is a US-based company engaged in the development, manufacture and marketing of generic and proprietary pharmaceuticals, biopharmaceuticals and active pharmaceutical ingredients, with more than 8,000 employees worldwide, and annual revenues of approximately of \$2.5 billion. It has reduced its collisions and costs by implementing an online driver risk assessment and improvement program for its 361 US-based company cars, mostly driven by young graduates engaged in pharmaceutical sales.

Using the online program, and with support from its fleet leasing supplier (PHH), the company has developed a long-term program to minimize collision frequency and costs. Based on the following phased approach, and now in its third year, the initiative relies on strong leadership and communication from senior managers.

Phase 1 - Culture Development – Safe Driving Pledge and policy knowledge check.

Phase 2 - Risk Assessment: RoadRISK Profile, Defensive Driving and feedback.

Phase 3 - Metrics: Driver Index based on risk assessments, collisions and licence checks.

Phase 4 - Training for all drivers: One More Second, RoadSKILLS and RiskCOACH modules.

Phase 5 - Individual risk reduction plan: Targeted Individual RiskCOACH modules, including 'Hit while parked', 'Distracted driving' and 'Arrive Alive' online board game.

The company has worked to get management buy-in, establish and communicate policies, implement the safety pledge, thoroughly assess drivers' skills and attitudes, provide feedback, conduct online training and measure results. Participants, who each spend 2-3 hours per year on the program, are supported through initial invitations to participate, regular reminders, feedback, certificates, good practice tips, regular emails, other communications, a management guide and presentations. This shows up in the almost 100% compliance with the program by participants at

every Phase (Figure 4). Senior management involvement, including the company's Senior Vice President of Sales personally endorsing the program by writing to colleagues, supported by frequent reminders and communications to engage participants were key factors in this success.

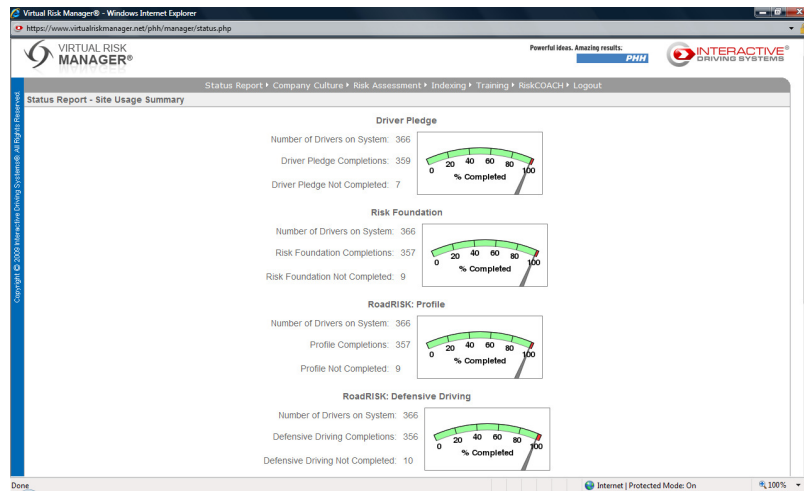


Figure 4 – Case 2 MIS summary dashboard for Phases 1 and 2 of program

Detailed analysis of the company's Driver Index, based on collision and licence check information, against the RoadRISK Profile and Defensive Driving risk assessments suggest that RoadRISK has a good capability to predict which drivers are likely to be at risk (Figure 5), and therefore most closely managed. Similar positive relationships were also identified against the participants' self-reported collisions and violations and against their Overall Index Value.

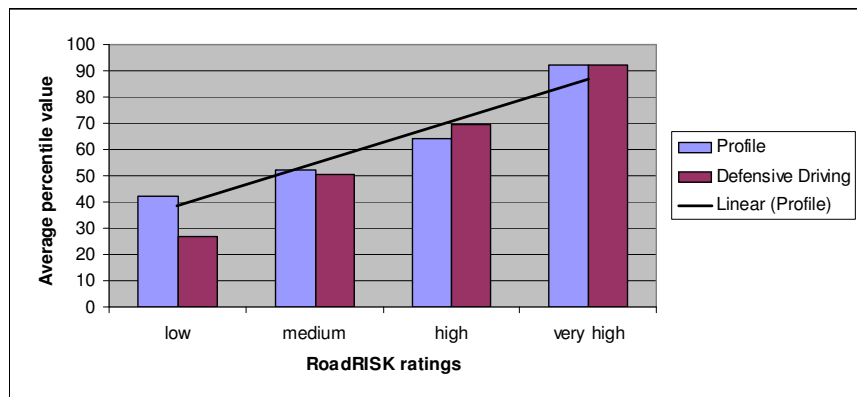


Figure 5 – Case 2 assessment outcomes compared to the company's Driver Index Percentile

Similar to Case 1, the initiative has received external recognition, being highly commended at the 2007 Brake Fleet Safety Forum awards in both the Company Driver Safety program and the Crash Analysis Procedures categories. PHH was Highly Commended in the Fleet Service Provider of the Year category for the five-phase fleet safety program on which the case is based.

Now in its third year the program has shown some very promising outcomes. These are identified in Figure 6 and include collisions and incident per vehicle and per million miles.

| Quarter ending | 30/09/2005 | 31/12/2008 |
|---|-------------------|-------------------|
| Average collision rate % | 25.4 | 23.2 |
| Average incident rate % | 28.4 | 16.1 |
| Average combined collision/incident rate % | 53.8 | 39.3 |
| Collisions per million miles | 9.5 | 8.3 |
| Incidents per million miles | 10.6 | 5.7 |
| Collisions/incidents per million miles | 20.1 | 14 |

Figure 6 – Case 2 program outcomes to date

4. Case 3 - Pharmaceuticals Company, Europe, Middle East and Africa

In 2008, the UK based road safety charity Brake honoured Case 3, a global pharmaceuticals company, for its sustained efforts to improve road safety over a 10-year period. The company's Europe, Middle East and Africa (EMEA) Fleet Safety manager collected the Road Risk Manager of the year and Fleet Safety Analysis and Action awards.

He said: *'We have invested heavily in fleet safety over many years, and are pleased to have received this recognition. It reflects well on all our people, but particularly the efforts of our Fleet Safety teams across the EMEA region.'*

Of all the activities the company is routinely engaged in during their working day, driving a vehicle on company business represents one of the greatest health and safety risks. In the EMEA region alone, the company operates over 13,500 field sales, service and management vehicles. For this reason, it has been proactive in managing its occupational road safety. Its Fleet Safety program has been in place for over 10 years and provides a worldwide standard framework for subsidiary companies to work to based on six key objectives, against which they are audited each year:

1. **Senior management support**, to ensure safe driving is part of the work culture, through leadership, monitoring and improvement, training and ongoing engagement.
2. **Field management** support and involvement.
3. **Motivation**, recognition and awareness for safe driving.
4. **Team performance**. Local Fleet Safety teams are responsible for implementing measures like training new drivers, reducing cases of high-risk driving and hiring field safety coordinators.
5. **Driver development** including orientation, home study and behind the wheel training.
6. **Health and safety**.

Despite different cultures, languages, barriers and challenges across the world, the Fleet Safety program has reduced injuries, collisions per million miles (CPMM) and incidents. The company attributes its success to the many practical actions that emerged from its objectives and policies, including:

- Detailed quantification of the value of employee road safety in direct and indirect costs of human and asset damage.

- Development of global standards, policies, procedures and processes.
- Strong involvement by senior management and tireless operating company Champions.
- Setting clear targets for road safety performance, supported by standardised global KPI reporting and monitoring of CPMM and other indicators. In the EMEA region, a target has been set to halve the CPMM figure to 3 by 2009.
- Collision trends are communicated to the entire field by e-mail, increasing awareness of driving situations to avoid and skills to use when those situations are unavoidable.
- A high-risk driver early detection system to identify drivers with the potential to drive unsafely.
- Sharing its good practices, including collision and incident reporting guidelines and definitions, which have been adopted by many other organisations.
- Leadership of pan-European fleet safety benchmark initiative and involvement in www.fleetsafety.net, to exchange cross-company good practices and experiences.
- Outreach via European Road Safety Charter, WHO/UN fleet safety program, the Private Sector Road Safety Collaboration and speaking at industry conferences.
- Engaging drivers to take road safety message home.
- Successful application of Virtual Risk Manager in the UK has shown the company to have one of the best safety cultures (99.7% policy awareness), and lowest % of High-risk drivers (1.6%) of all the organisations that have ever used the system. Participating businesses beat their CPMM KPI targets for the UK, whereas non-participants exceeded it. The outcomes from the Virtual Risk Manager RoadRISK assessment also correlated well against the three-year collision history of all 950 participant drivers (Figure 7), allowing the potential to predict collision involvement with some confidence.

| Risk assessment rating | Collisions and incidents 2006-2008 |
|-------------------------------|---|
| High | 1.75 |
| Medium | 0.61 |
| Low | 0.31 |

Figure 7 – Case 3 assessment outcome compared to collisions and incidents in last 3 years

These initiatives have led to the following quantifiable road safety improvements 1997 to 2007:

- Worldwide CPMM reduced from 8.7 to 5.3. EMEA reduced from 12.6 to 6.6.
- % of fleet in a collision reduced from 18.2 to 11.6. EMEA reduced from 27.9 to 15.6.
- EMEA total vehicle related lost workday cases reduced from 19 to 3.

Despite this sustained success, the company continues to innovate new engagement programs.

5. Discussion and lessons for research, policy and practice

All three of the participant organisations from around the globe appear to have been proactive in targeting and improving the road safety performance of their motor vehicle fleet drivers. Cases 1 and 2 have gone from having no programs in place, to implementing detailed online driver risk assessment monitoring and improvement programs that reached out to and ‘touched’ all drivers,

and their managers, via a detailed MIS. Case 3 has a more mature fleet safety program in place, including behind the wheel defensive driver training for all employees.

All three companies have in common the fact that they have invested management and driver time in their programs, which have been comprehensive and included all the relevant people in their organisation. All the companies have also focused heavily on 'Evaluation' metrics, reviewing program outcomes to show impact, based on a range of key performance indicators (KPIs).

A potential limitation or criticism of the programs described rests on the fact that it is difficult to identify the likely impact of each individual countermeasure. For example in Cases 1 and 2 how important is the risk assessment program, the training interventions, the focus on the issue by the fleet manager or support from the insurer or leasing company? These influencing factors are impossible to quantify in this type of small case study-based program. In Case 3, a whole range of manager and driver level initiatives were listed, the individual impact of none of which can be easily quantified. Despite this, however, all the recent research on occupational road safety [including Haworth et al 2000, Murray et al 2003 & Wills et al 2006], and worldwide experience over many years suggests that there are no 'golden, silver or even bronze' bullets. Instead, combinations of cultural, management, driver, vehicle and journey, as well as societal, based factors are important.

The cases described in many ways support the recommendations of Haworth et al [2000] and provide several important lessons that researchers, policy makers and managers in other organisations worldwide, can learn from - particularly, the attitude and aptitude of managers in organisations are vital to the success or otherwise of a fleet safety program. In all the cases described, and in every case the authors have been involved in over many years, committed management champions at all levels have been important in overcoming the many potential barriers that exist to improving safety. Typically, these are individuals who identified the problem, and engaged the organisation and their colleagues to assess the risks and overcome the barriers to develop targeted safety programs.

As well as researchers, expert practitioners, such as Gallemore [2008], have discussed in detail what they see as the key success factors – or the required DNA - for fleet safety management, many of which were evident in the three cases described, and which support the findings of Haworth et al [2000]:

- The need for visible commitment from the top down.
- An enthusiastic fleet safety champion.
- Consistent implementation across all locations.
- A cross-functional steering group able to engage stakeholders.
- Accountability and ownership at all levels.
- Regular communication and awareness training.
- Setting and maintenance of high level of expectations.
- Measuring and reviewing performance by business and region.
- Implementing of both proactive and reactive indicators and targets.
- Audit compliance and evaluation.

The three cases also offer lessons for policy makers, suggesting that occupational road safety is an opportunity to target a large number of drivers through the workplace. Many authors cited throughout this paper [including Murray & Pratt 2007, McNoe et al 2005, Charbotel et al 2001 and Wills 2007, Stuckey et al 2008 & Murray et al 2009] have recommended how this could be undertaken at both policy and organisational levels.

One particular area for policy makers to explore is the potential of fleet auditing and benchmarking as a method of identifying in detail the DNA of organisations like those described for improving safety outcomes. What do they have in common? What can others learn from them? UK Department for Transport projects on Driving for Better Business and Fleet Safety Benchmarking [www.fleetsafetybenchmarking.net], in which the case study companies participated, are good examples of how policy makers have successfully adopted this approach. Australian State Government guidance, such as Worksafe (2008), is a good local example.

Another lesson, or area of opportunity for policy makers, is the potential for national- or macro-level data linkages, similar to the risk data-warehouse or Driver Index implemented by Case 2. At the national policy- or macro-level, common coding is required to link and data-mine several existing datasets such as police-collected road collision statistics, hospital-collected health data and workers compensation/safety & health data.

6. Conclusions

The paper has briefly described research and three separate cases of proactive organisations that have reviewed their performance and implemented various management-led programs to risk assess, monitor and improve the road safety of their employees who drive as part of their work. In so doing, it has helped to address an important gap in the research literature and industry practice. It has begun the process of identifying the successful DNA of organisations that have developed and evaluated effective processes for improving occupational road safety. Management involvement, risk assessment, targeted driver improvement and detailed monitoring of outcomes all appear to be important success factors. Each of the three short cases from around the globe have first and foremost invested management time and resources in ongoing programs over several years based on both worldwide research and experience.

Several key success factors, lessons and potential barriers from which others can learn and seek to emulate were also identified; and although not without some limitations, particularly around the quantification of individual interventions, the cases are useful for researchers, practitioners and policy makers. They also provide good practice ideas and a template for turning research on occupational road safety into practice, and for feeding good business practice into research.

7. References

1. CHARBOTEL B, CHIRON M, MARTIN J & BERGERET A. Work related road collisions in France. *European Journal of Epidemiology*, Vol 17 (8), 2001, p773-778
2. DARBY P, MURRAY W & RAESIDE R. Applying online fleet driver assessment to help identify, target and reduce occupational road safety risks. *Safety Science* 47, 2009, p436-442

3. GALLEMORE P. Safety Benchmarking: engaging the business. Paper published in KEELER C and MURRAY W (eds) Report from the Fleet Safety Benchmarking Seminar, London, 16 January 2008, www.fleetsafetybenchmarking.net
4. GREGERSEN N.P, BREHMER B & MOREN B. Road safety improvement in large companies. An experimental comparison of different measures. Accident Analysis and Prevention, Vol 28, 1996, p297–306
5. HAWORTH N, TINGVALL C and KOWADLO N. Review of Best Practice Road Safety Initiatives in the Corporate and/or Business Environment, Report N. 166, Monash University, March 2000
6. MCNOE B, LANGLEY J & FEYER A. Work-related fatal traffic crashes in New Zealand: 1985-1998, New Zealand Medical Journal, Vol 18, No 1227, 2005
7. MURRAY W & PRATT S. Worldwide Occupational Road Safety (WORS) Review Project. Prepared for the Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, USA, April 2007, www.cdc.gov/niosh/programs/twu/global
8. MURRAY W, ISON S, GALLEMORE P & NIJJAR H. Effective occupational road safety programs: A case study of Wolseley. Paper 09-1327, presented at the 88th Annual Transportation Research Board Meeting, January 11-15, 2009b
9. MURRAY W, NEWNAM S, WATSON B, DAVEY J and SCHONFELD C. Evaluating and improving fleet safety in Australia. Australian Transport Safety Bureau Research Report, 2003, www.atsb.gov.au/publications/2003/eval_fleetsafe.aspx
10. MURRAY W, PRATT S, HINGSTON J & DUBENS E. Promoting Global Initiatives for Occupational Road Safety White Paper: Review of Occupational Road Safety Worldwide, February 2009a (Draft), www.cdc.gov/niosh/programs/twu/global
11. REA M, MURRAY, W, DARBY, P & DUBENS E. Comparing IT-based driver assessment results against self-reported and actual crash outcomes in a large motor vehicle fleet. Proceedings of the Road Safety Research, Policing and Education Conference, Perth, November 2004
12. SALMINEN S. A social psychological discussion method to improve the safety of work-related traffic. Psykologia, Vol 41, 2005, p107-111, ISSN 0335-1067
13. SALMINEN S. Two interventions for the prevention of work-related road accidents. Safety Science Vol 46, 2008, p545–550
14. STUCKEY R, LAMONTAGNE A & SIM M. Working in light vehicles - a review and conceptual model for occupational health and safety. Accident Analysis & Prevention, Vol 39 (5), September 2007, p1006-1014
15. WHITE J & MURRAY W. Occupational Road Safety case study: Roche Australia cuts risks, collisions and costs. Journal of the Australian College of Road Safety. August, Vol 18 (3), 2007, p28-29
16. WILLS A, WATSON B and BIGGS H. Comparing safety climate factors as predictors of work-related driving behaviour. Journal of Safety Research, Vol 37, 2006, p375-383
17. WILLS A. Fleet Safety: the Road from Research to Practice. Paper presented at the Australasian Road Safety Research, Education and Policing Conference. Melbourne, Australia, 17-19 October 2007
18. WorkSafe Victoria: Guide to safe work-related driving, 2008