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# Development of a practical safety audit tool to assess fleet safety management practices

Rebecca Mitchell, Rena Friswell, and Lori Mooren

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TARS Research

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TRANSPORT AND ROAD SAFETY
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# Abbreviations

| Abbreviation | |
|---|---|
| ABS | Anti-lock Braking System |
| ABWS | Advance Brake Warning System |
| ACT | Australian Capital Territory |
| ADCO | Abu Dhabi Company for Onshore Oil Operations |
| AfMA | Australasian Fleet Managers Association |
| ALC | Australian Logistics Council |
| ANCAP | Australian New Care Assessment Program |
| ATSB | Australian Transport Safety Bureau |
| BSM | Behavioural Self Monitoring |
| CARRS-Q | Centre for Accident Research and Road Safety, Queensland University of Technology |
| CDC | Centres for Disease Control |
| DAQ | Driver Attitude Questionnaire |
| DBQ | Driver Behaviour Questionnaire |
| DDC | Defensive Driver Courses |
| DfT | Department for Transport, United Kingdom |
| FSI | Feedback from Sergeant and Inspections department |
| FSS | Feedback from Supervising Sergeant |
| GPS | Global Positioning System |
| HREC | Human Research Ethics Committee |
| HSE | Health and Safety Executive, United Kingdom |
| INRETS | Institut nationale de recherche sur les transpors et leur securite, France *(now IFSTTAR Institut français des sciences et technologies des transports)* |
| IRMRC | Injury Risk Management Research Centre *(now Transport and Road Safety (TARS) Research)* |
| ISO | International Standardization Organization |
| MUARC | Monash University Accident Research Centre |
| NHTSA | National Highway Traffic Safety Authority |
| NHVAS | National Heavy Vehicle Accreditation Scheme |
| NIOSH | National Institute for Occupational Safety and Health |
| NSW | New South Wales |
| ORSA | Occupational Road Safety Alliance, United Kingdom |
| OHS | Occupational Health and Safety |
| ORS | Office of Regulatory Services |
| PPE | Personal Protective Equipment |
| RCT | Randomised Control Trial |
| RoSPA | Royal Society for the Prevention of Accidents, United Kingdom |
| RTA | Roads and Traffic Authority of NSW *(now NSW Department of Transport, Roads and Traffic Authority)* |
| SMS | Safety Management System |
| SSROC | Southern Sydney Regional Organisation of Councils |
| TRB | Transportation Research Board |
| TRL | Transport Research Laboratory, United Kingdom |

| Abbreviation | |
|---|---|
| TWU | Transport Workers Union |
| UK | United Kingdom |
| UNSW | University of New South Wales |
| US | United States |
| WA | Western Australia |

# Development of a practical safety audit tool to assess fleet safety management practices

## Executive summary

Work-related vehicle crashes are the single largest cause of fatal occupational injury in Australia. There are also many more vehicle crashes that result in injuries and/or vehicle damage, representing a significant preventable cost to the community. There is a wealth of information that describes the various risk factors for road trauma and a range of these risk factors are amenable to control by employers. However, there are few studies that investigate management practices used for light vehicle fleets (i.e. vehicles, such as cars and vans less than 4.5 tonnes). One of the impediments to obtaining and sharing information on effective fleet safety management is the lack of an evidence-based, standardised measurement tool for light vehicle fleet safety that would allow organisations to consistently benchmark their performance. This research aimed to develop an audit tool to assess fleet safety management practices in light vehicle fleets and to trial the usability of the fleet safety audit tool in several organisations. This work is the necessary first step in the creation of a standard measurement tool to assess fleet safety management practices.

The fleet safety management audit tool was developed by triangulating information from three sources that included a review of the published literature on fleet safety management practices supplemented by semi-structured interviews with 15 fleet managers and 21 fleet drivers. The useability of the audit tool was then assessed with 5 organisations not involved in the audit tool development phase.

The audit tool assesses the management of fleet safety against five core categories of practice that were identified from the literature and interviews as being associated with fleet safety. These categories are: (1) management, systems and processes; (2) monitoring and assessment; (3) employee recruitment, training and education; (4) vehicle technology, selection and maintenance; and (5) vehicle journeys. Each of these five categories consists of between 1 and 3 sub-categories. Organisations are rated at one of 4 levels on each sub-category to indicate the degree to which they implement fleet safety management best practice in that area. Importantly, the ratings are grounded in tangible practices that can be objectively assessed. Overall, useability assessments of the audit tool rated it easy to use and understand and potentially useful for benchmarking fleet safety performance. The useability assessments identified several improvements that could be made to the tool, including the inclusion of safety and emergency equipment within fleet safety management criteria and the addition of a lettering system to help users differentiate the criteria for the different levels of each sub-category.

The fleet safety audit tool was designed to identify the extent to which fleet safety is managed in an organisation against best practice. The audit tool can be used to conduct audits within an organisation to provide an indicator of progress in managing fleet safety and it can be used to benchmark performance with other organisations. Further development work is now required to validate the audit tool categories and scoring in the wider population of light vehicle fleets, to confirm the relationship between audit tool scores and organisational fleet safety outcomes, and to ensure the tool remains current as new evidence about effective fleet safety management practices becomes available.

## 1. Introduction

Work-related vehicle crashes are the most common cause of fatal, occupational injury in Australia [1]. In New South Wales (NSW), around 16% of all vehicle fatalities [2] and around 10% of injury hospitalisations following a vehicle crash [3] each year have been identified as work-related. NSW workers' compensation statistics indicate that 8.6% of all claims for absences of five or more days and 9.9% of the total gross compensation costs incurred are for road traffic crashes at work and while commuting [4]. In addition to these crashes that result in serious and prolonged injuries, there are many more vehicle crashes that result in minor injuries (i.e. injured workers not admitted to hospital) and/or vehicle damage [5].

In NSW, around 800,000 vehicles are used for fleet purposes [6]. It has been estimated that 20-30% of fleet vehicles crash each year, with drivers of company vehicles experiencing 50% more crashes than private vehicle drivers [7]. Fleet vehicle crash costs have been estimated to account for 13-15% of all fleet spending [7].

The management of fleet vehicles has traditionally focused on asset management rather than on occupational health and safety (OHS) management [7]. In the road safety field, there is considerable knowledge about risk factors for vehicle crashes [8] and a range of these risk factors are amenable to control by employers. However, there have been few studies that document the fleet safety management practices used by organisations and fewer still that evaluate safety management practices in the light vehicle fleet context (i.e. vehicles, such as cars and vans less than 4.5 tonnes) [9]. One of the impediments to gathering and sharing information on effective fleet safety management is the lack of any standardised measurement tool capable of capturing the complex system of risk management policies and practices that an organisation might implement.

In the risk management field, various audit tools have been developed for assessing OHS risk in different industries [10-13]. No audit tools specifically focus on assessing the management of light vehicle fleet safety and would allow organisations to consistently assess themselves against current best practice. This research aims to: (1) develop a safety audit tool to assess fleet safety management practices; and (2) trial the usability of the fleet safety audit tool in several organisations. The fleet safety audit tool will be developed by triangulating information from three sources: (i) the current published literature on fleet safety management; (ii) interviews with fleet managers; and (iii) interview with fleet drivers.

## 2. Literature review

For the literature review, fleet vehicles were considered to encompass light vehicles, such as cars and vans less than 4.5 tonnes [14] and 'best practice' was considered to refer to management practices that have been identified as superior and/or have been shown through research and/or experience to be associated with a reduction in vehicle crashes, occupant injuries or near-miss crashes.

## 2.1 Method

The literature search was conducted in two phases. First, a search was conducted of both the academic literature and the grey literature for material on fleet safety management, in particular for reported 'best practice' initiatives related to the management of fleet safety. In the second phase, the literature search was broadened to encompass 'best practice' initiatives for more general OHS management.

### *2.1.1 Phase 1: Fleet safety management best practice*

To ensure wide, multidisciplinary coverage of the academic literature a range of databases were interrogated. Table 2.1 details the databases and search terms employed. Literature searches were conducted on all fields, except for Scopus where the search was restricted to 'abstract only'. All searches were restricted to English language documents. References with terms 'truck', 'bus', 'freight', 'heavy', 'marine', 'ship', 'navy', 'air', and 'aviation' were excluded after abstract retrieval as they did not meet the fleet vehicle definition. However, references that specifically focused on the best practice management of heavy vehicle fleets were retained due to the likely overlap of common themes relating to the management of light vehicle fleets. This strategy resulted in 1,042 references. The titles and abstracts were then examined individually by two of the authors (RM and RF) and irrelevant items that did not refer to best practice fleet safety characteristics or factors related to good fleet safety performance or elements that were found to be associated with good or poor fleet safety performance were culled. The remaining 101 documents were accessed and a further 64 were culled, leaving 37 in the final review.

**Table 2.1: Databases and terms used for phase 1 search of academic literature**

| Databases | Search terms |
|---|---|
| SourceOECD | Fleet safety + Vehicles |
| PsycINFO | Fleet management + Vehicles |
| Medline | Fleet safety audits + Vehicles |
| Embase | Fleet safety evaluation + Vehicles |
| Web of Science | Audit tools + Vehicles |
| Applied Social Sciences Index and Abstracts (ASSIA) | OHS management system + Vehicles |
| Health and Safety Science Abstracts (HSSA) | Motor carrier safety + Vehicles |
| Compendex | Safety management system (or SMS) + Vehicles |
| Scopus | Safety management system (or SMS) + vehicles |
| | Work related driving safety + Vehicles |

To access the grey literature, targeted searches were conducted of Australian and international government, research and other agency websites where the organisations were known to be involved in transport and occupational safety (Table 2.2). These websites

were searched for the following material related to fleet safety: (i) management/audit tools; (ii) guidelines or advisory information; (iii) reports or reviews; or (iv) a synthesis of the literature on fleet safety, in particular best practices for fleet safety management. The documents and reports were then examined individually by one of the authors (RM) and classified by type of literature (see Section 2.1.1.1) and relevance to inform the development of an audit tool to assess fleet safety management practices. Thirty-nine documents and reports were identified for detailed review as these documents either referred to best practice fleet safety characteristics or factors related to good fleet safety performance or elements that were found to be associated with good or poor fleet safety performance. In addition, a Google search was conducted to identify any relevant industry literature, using search terms 'fleet safety' + 'audit' and 'fleet safety' + 'best practice'. This produced 37 additional documents that had not been previously identified to be reviewed and only one of these documents was retained as relevant after detailed examination.

The reference lists of all identified literature were scanned for any other reports or documents missed during the formal search process. A further 74 articles and reports were identified in this process and 44 of these documents were retained after examination. The final list of publications was also examined by Australasian Fleet Managers Association (AfMA) representatives for known omissions.

#### 2.1.1.1 Classification of Phase 1 literature

The references identified in Phase 1 of the search were classified into the following categories for analysis and reporting:

(i) Intervention studies directly measuring the impact of changed practices on safety outcomes (e.g., randomised control trials; case-control studies; pre-post studies; meta analyses, quantitative and systematic reviews; case studies);

(ii) Descriptive studies of relationships between practices and outcomes;

(iii) Characterisation of hazards;

(iv) Implementation issues (e.g., barriers to implementation);

(v) Discussion or opinion pieces and other publications; and

(vi) Guidance or audit materials.

At this stage, the references were also vetted for duplications where authors had reported the same material in multiple publications (for example, conference and journal papers on the same study or multiple conference papers with the same content).

**Table 2.2: Australian and international government, research and other agency websites searched for grey literature**

| Organisation | |
|---|---|
| **Australasia** | **North America** |
| Australasian Fleet Managers Association (AfMA) | Centers for Disease Control and Prevention (CDC), US |
| Australian Bureau of Statistics | Department of Transportation, US |
| Australian Logistics Council | Insurance Institute for Highway Safety, US |
| Australian Transport Council | Liberty Mutual Research Institute for Safety |
| Australian Transport Safety Bureau (ATSB) | National Highway Traffic Safety Authority (NHTSA), US |
| Austroads | National Institute for Occupational Safety and Health (NIOSH), US |
| Centre for Accident Research and Road Safety (CARRS-Q), Queensland University of Technology | The Virginia Tech Transport Institute |
| Centre for Automotive Safety Research, University of Adelaide | Transport Canada |
| Courier and Taxi Truck Association | Transportation Research Board (TRB), US |
| Institute of Transport and Logistics Studies, University of Sydney | Workplace Safety and Insurance Board, Canada |
| Monash University Accident Research Centre (MUARC) | **Europe** |
| National Transport Commission | Department for Transport (DfT), UK |
| New Zealand Ministry of Transport | European Agency for Safety and Health at Work |
| New Zealand Transport Agency | Eurosafe (European Association for Injury Prevention and Safety Promotion) |
| Northern Territory WorkSafe | Health and Safety Executive (HSE), UK |
| Office of Regulatory Services (ORS) WorkCover (ACT) | Institut nationale de recherche sur les transpors et leur securite (INRETS), France |
| Office of Road Safety (Western Australia) | *(now IFSTTAR Institut français des sciences et technologies des transports)* |
| Queensland Transport | International Labour Organization |
| Roads and Traffic Authority of NSW *(now NSW Department of Transport, Roads and Traffic Authority)* | Karolinska Institute |
| Roadwise | Norwegian Centre for Transportation Research |
| Safe Work Australia | Occupational Road Safety Alliance (ORSA), UK |
| SafeWork South Australia | Royal Society for the Prevention of Accidents (RoSPA), UK |
| Southern Sydney Regional Organisation of Councils (SSROC) | Transport Research Laboratory (TRL), UK |
| Transport Workers Union (TWU) | World Health Organization |
| VIC Roads | |
| WorkCover NSW | |
| WorkCover Queensland | |
| WorkCover South Australia | |
| Workplace Standards Tasmania | |
| WorkSafe Victoria | |
| WorkSafe Western Australia | |

### *2.1.2 Phase 2: Occupational Health and Safety management best practice*

As fleet safety management is generally encompassed within a wider field of OHS management, characteristics or factors related to good OHS performance were also identified from the published literature. Again, a range of databases were examined and search terms utilised (Table 2.3).

Literature searches were conducted on all fields, except for Scopus where the search was restricted to 'abstract only'. All searches were restricted to English language documents. This strategy resulted in 333 references. The titles and abstracts were then examined individually by one of the authors (RM) and irrelevant items that did not refer to identified best practice OHS characteristics were removed. Forty-one documents were retained in the final set for detailed review.

**Table 2.3: Databases and terms used for phase 2 search of academic literature**

| Database | Search terms |
|---|---|
| SourceOECD | Workplace safety management + best practice |
| PsycINFO | Safety performance + best practice |
| Medline | Work safety + best practice |
| Embase | Work safety + injur* reduction |
| Web of Science | Work safety + good performance |
| Applied Social Sciences Index and Abstracts (ASSIA) | Occupational safety + best practice |
| Health and Safety Science Abstracts (HSSA) | Occupational safety + injur* reduction |
| Compendex | Occupational safety + good performance |
| Scopus | |

## 2.2 Results

The last comprehensive review of best practices in road safety for the corporate environment was conducted by Haworth and colleagues in 2000 [7]. The current literature review extends this work, bringing the review of best practices in fleet safety up to the year 2010 and also incorporates general OHS best practice strategies[1].

[1] Since the current review was conducted, a review by Newnam and Watson has also been published (15. Newnam, S. and Watson, B., *Work-related driving safety in light vehicle fleets: A review of past research and the development of an intervention framework.* Safety Science, 2011. 49(3): p. 369-381.). Like the current review, and Haworth et al (7. Haworth, N., Tingvall, C., and Kowadlo, N., *Review of best practice road safety initiatives in the corporate and/or business environment*. 2000, Monash University Accident Research Centre, Report No. 166: Melbourne.), these authors find the light fleet safety research literature to be incomplete, disjointed and often weak.

### *2.2.1 Intervention studies*

Empirical intervention studies provide the strongest evidence for effective fleet safety management practices. However, very few intervention studies have been reported. Haworth et al [7] examined initiatives implemented in an attempt to improve fleet safety performance, such as the use of guidelines, driver selection and induction procedures, vehicle selection, driver training, education and management, incentives and disincentives and company safety programs. However, relatively few of these initiatives had been evaluated for their effectiveness to contribute to a reduction in work-related vehicle crashes [7].

#### 2.2.1.1 Reviews and meta analyses

Ker et al [16] examined the effectiveness of post-licence driver education for preventing road traffic crashes using a systematic review and meta analysis of randomised controlled trials (RCT). Data were pooled from 21 RCTs and of these, 19 trials reported traffic offences, with a pooled relative risk of 0.96. Fifteen trials reported traffic crashes with a pooled relative risk of 0.98. Four trials reported injury crashes with a pooled relative risk of 1.12. The review provided no evidence that post-licence driver education was effective in preventing road injuries or crashes. However, it did find that post-licence driver education was associated with a small reduction in the occurrence of traffic crashes, which could be due to selection biases or bias in the included trials.

Lund and Williams [17] reviewed 14 studies that examined the effectiveness of defensive driver courses (DDC). About a third of the studies provided methodologically strong tests of DDC, but the remainder had design flaws that made their findings questionable or involved inadequate tests of DDC (e.g. self-reported crashes; inappropriate comparison groups; quasi-experimental designs, non-random assignment). Only among the flawed designs were there large, positive effects of DDC. In the methodologically strong tests, DDC had no consistent effect on vehicle crashes, but the frequency of traffic violations decreased by about 10%.

Olson and Winchester [18] examined 23 studies evaluating behavioural self-monitoring (BSM) techniques for altering workplace productivity-related and safety-related behaviours. Five of the studies targeted safety-related behaviours, three of them among samples of professional drivers (short-haul truck drivers and bus drivers). All five safety-related studies used BSM in conjunction with feedback and one used goal setting as well. The mean effect size of BSM interventions on safety-related behaviours was large (d=2.6) and similar to that observed for productivity-related behaviours. Because the study designs were not robust and the sample sizes were small (n=4 to 30) these findings need validation. The application of BSM in light-vehicle fleets should also be investigated.

Lund and Aaro [19] sought to identify the characteristics of successful accident and injury prevention interventions across all domains, not just in the fleet or occupational context. They reviewed 596 controlled studies and concluded that safety information measures (media, leaflets etc) targeting knowledge or attitude change generally had little impact on behaviour or accidents when used in isolation. Small group discussions or counselling studies showed mixed results overall but the two workplace discussion group studies on seat belt use produced positive changes in behaviour. Education, skills training and

feedback targeting behaviour directly produced very few significant effects, but among them were workplace studies of safety training and feedback. Use of appropriate rewards was often associated with increases in safe behaviour across the studies. Similarly, multifaceted programs targeting attitudes, behaviour and/or structural factors (equipment, environment, legislation) were judged to be effective especially when they were long lasting, used multiple communication channels and employed a raft of preventive measures.

#### 2.2.1.2 Pre-post studies

Seven studies using pre-post designs have examined the impact on crashes or unsafe driving behaviour of practices targeting fleet driver behaviour.

One of the most well known experimental studies of fleet safety was conducted by Gregersen et al [20] in the telecommunications company, Televerket, in Sweden. Four experimental groups of around 900 drivers each received an intervention (i.e., 8 hours of in-vehicle driver training; safety campaign meetings; group discussion; bonus/group monetary reward) and were compared with one control group. For each group, crash rate per 10,000 kilometres and crash costs were monitored for 2 years prior and 2 years after the intervention. Despite some study limitations (e.g., movement between experimental groups and around 10-20% drop out), the driver training, group discussion and bonus groups all showed reductions in crash rate and all experimental groups showed a decrease in crash costs. Importantly, the discussion group method achieved considerably more safety benefit of all interventions.

Wouters and Bos [21] examined changes in vehicle crash involvement in seven experimental fleets (n=270 vehicles) before and after the installation of in-vehicle data recorders. Data recording was coupled with management feedback to drivers about their recorded behaviour. The experimental fleets were compared to twelve matched control fleets (n=570 vehicles). The study fleets ranged from 5 to 160 vehicles. Most were heavy truck fleets, but car, taxi and bus fleets were also included. In all but one of the experimental fleets, data recorders captured the moments before and after incidents, rather than recording continuously. Crashes were recorded for at least 12 months prior and 12 months after the installation of the data recorders. Overall, a 20% average reduction in crashes was attributed to the intervention, rising to 31% when experimental and control fleets were drawn from the same companies. Viewed separately, light vehicle fleets appeared unaffected by the intervention but this result may have been an artefact of the relatively small number of light vehicles observed. Further, variations in feedback implementation may have contributed to variations in intervention effectiveness between fleets. Unfortunately, the behavioural feedback given to drivers by management at the participating fleets was not standardised and no monitoring of the recorded incidents or feedback delivery was undertaken by the researchers. This makes it difficult to gauge the relative importance of management monitoring and feedback to the observed results.

In one of the earliest studies of fleet safety interventions, Larson et al [22] examined the effect of in-vehicle speed recorders on speed and crashes in the Tennesee police department. Nineteen cars in the Department's Traffic section were fitted with tachographs to record speed. Four sequential phases of the intervention were compared: baseline, tachographs without feedback, tachographs with feedback from the supervising sergeant

(FSS), and tachographs with sergeant feedback plus review by the inspections department (FSI). Feedback could involve disciplinary action for drivers (FSS, FSI) and sergeants (FSI). Data were extracted for 15-day periods during each phase. Compared to baseline, only the FSI condition was associated with reduced injury crash rates and police-contributory crash rates (per 100,000 miles). Corresponding drops in daily maximum speeds were observed as well. Two other sections of the force, Patrol (n=162 vehicles) and Canine/tactical/extra (n=43 vehicles), were exposed to the baseline and FSI conditions only and also showed crash rate reductions with the intervention. Direct crash costs in the Patrol section in the 18 months after introduction of the FSI were reduced by 43% compared to the preceding 18 months. Although limited statistically, the study suggests that feedback is a critical ingredient in any behavioural monitoring intervention but that the nature of the feedback process is important. Feedback was effective when it was part of a formal and authoritative monitoring system carrying potential consequences for both the driver and supervisor. The reason feedback was not effective in FSS is unclear because the quality and frequency of feedback delivery was not measured.

Hickman and Geller [23] compared the effects on over-speeding and rapid braking of two driver self-management interventions. One depot of short haul truck drivers was randomly allocated to each intervention. Their driving behaviour before, during and after the intervention were monitored using in-vehicle recorders. During the intervention, both groups received training in identifying behavioural antecedents and consequences of the target behaviours, behavioural goal setting and reward administration. The pre-behaviour group (n=21) recorded behavioural intentions/goals at the start of each day. The post-behaviour group (n=12) recorded daily behaviours at the end of each day. Drivers were promised a small monetary reward for completing each daily record. Weekly feedback on self-recorded versus objective performance was provided to individual drivers. Significant reductions in objective over-speeding during the intervention compared to the baseline and reversal periods occurred in both groups. However, because the pre-behaviour group had low levels of extreme braking before the intervention, only the post-behaviour group showed a significant reduction in this behaviour. The results may have been due to social aspects of study participation rather than any specific effect of the interventions. The design did not allow this explanation to be discounted.

Geller et al [24] report the combined results of 28 workplace seat-belt intervention studies conducted at ten organisations in the United States (US). Belt wearing behaviour was observed while staff were entering or exiting the workplaces. In general, the programs employed either: (i) direct immediate rewards (monetary and prizes); (ii) direct delayed rewards (including both individual prizes and prizes linked to the performance of the work group); (iii) indirect rewards (pledge card lottery); or (iv) no reward (awareness/ commitment discussion sessions). Sizeable increases in belt wearing were observed overall, decreasing after program cessation to levels that remained above baseline. All four types of incentive and reward schedules produced similar improvements in behaviour (adjusting for baseline differences) and drop off after program withdrawal. The authors claimed better long-term maintenance in the no reward programs. Variations in the programs, baseline behaviour levels, follow-up timeframes, and a lack of statistical analysis make generalisation of the findings difficult.

Only one study examined the impact of vehicle factors on light vehicle fleet crashes. Shinar [25] evaluated the on-road effectiveness of an Advance Brake Warning System (ABWS) in

reducing rear end crashes by other drivers into government fleet vehicles. Not to be confused with Centre High Mounted Stop Lights, the ABWS illuminates the brake lights in response to a sudden release of pressure on the accelerator. This gives drivers in following vehicles additional warning time that the vehicle ahead may be about to brake suddenly. Earlier laboratory and simulation studies had suggested that ABWS may reduce rear end crashes, however, little difference in per kilometre crash rates was observed between fleet cars with (n=382) and without (n=382) ABWS over a three year period.

No pre-post studies were identified that systematically evaluated light vehicle fleet safety management systems more generally. Tapsas and Harris [26] and Pope [27] both reported intended evaluations of fleet safety management interventions but the current review did not find any follow-up work in the published literature. In the US heavy vehicle fleet sector, Naveh and Marcus [28] examined regulatory safety compliance and crash data for 40 large company fleets two years before and after they qualified for ISO9002:1994 certification. These companies were compared to 1742 matched control companies (without certification). Certification was related to improved safety compliance and reduced crashes relative to baseline and controls, and crash reduction was partially mediated by improved safety compliance. Although implementation of ISO9002:1994 is organisation-specific, this study suggests that the audited application of 'best practice' standards to driving, vehicles and management processes does improve fleet safety performance, at least in the heavy vehicle sector.

#### 2.2.1.3 Case studies

The case studies reviewed here examine changes in a single organisation or group when an intervention has been implemented.

In the mid 1990's the NSW Police Force adopted a number of fleet safety initiatives, including a safe driving policy, increased accountability, decentralisation of premiums management with retention of savings in premiums by operational commands, and a computerised Safer Driver System. The introduction of these initiatives saw savings of $2 million in insurance premiums and a reduction in 'unattended or unknown' vehicle crashes that signalled a higher level of accountability. However, it is not known whether one or a combination of these initiatives are responsible for these improvements [29]. Sochon and Brisbane [29] also report that other companies, such as Telstra, 3M Company and Orica, have reduced insurance claims by implementing management initiatives to encourage safe driving, but the details of the initiatives were not reported.

Al Kurdi et al [30] described the components of a road safety management program adopted by the Abu Dhabi Company for Onshore Oil Operations (ADCO) in response to three fatal crashes in their workforce in 2004. The program began with the establishment of a dedicated body tasked with identifying existing problems with road safety management at the company and recommending appropriate intervention strategies to address these problems. The resulting program spanned all levels of the organisation and included: (i) in-vehicle driver monitoring with monthly supervisor review and driver coaching when required; (ii) establishment of an organisation-wide road safety management committee to improve leadership, communication, awareness and practice around road safety; (iii) collaboration with traffic police; and (iv) introduction of strategies to reduce the number of

vehicle journeys and improve journey management. After implementation of the program, no further fatalities were reported. "Sizeable reductions" in driver speeding, and seat belt violations were claimed, but no supporting data were presented by the authors. The study did not allow the effectiveness or otherwise of any particular components of the safety management program to be assessed.

Both Matusalen et al and O'Connell [31-32] reported on fleet safety activities undertaken by Chevron within its oil exploration and production operations in Western Venezuela. Matusalen et al [31] described the broad fleet safety program primarily aimed at employee staff. It included:

(i) root cause analysis of motor vehicle crashes and a systematic approach to crash investigation, reporting and follow-up action;

(ii) journey management including the introduction of alternative transport (buses) to company sites to reduce exposure, and stricter regulation of company vehicle use;

(iii) installation of in-vehicle driver monitors in all company vehicles. These provided immediate auditory warnings of safe driving breaches to drivers, as well as monthly feedback to supervisors to be used as a basis for driver coaching, incentives and disciplinary action. Individual driver's monitoring scores were displayed publicly on site. A standardised system for determining penalties for breaches of safe driving policies was introduced;

(iv) regular field spot checks of vehicles and driving practices;

(v) designation of a management sponsor for road safety and dedication of a position to monitor and evaluate road safety policies, procedures and outcomes;

(vi) defensive driver training and regular driver safety meetings;

(vii) modifications to site parking and roadways; and

(viii) safety inspections of contractor vehicles.

Implementation of the program began in 2001. Between 2000 and 2005, company crash numbers dropped by 79% despite a 68% increase in the number of fleet vehicles. Again, the impact of particular components of the safety management program on safety outcomes could not be isolated.

O'Connell [32] reported the effects of extending the in-vehicle driver monitoring program, above, to 19 subcontractor companies with around 230 drivers. Implementation occurred in 2005. After an initial 3-month period when safe driving scores actually deteriorated, the percentage of subcontractor drivers achieving acceptable safe driving scores began to improve and continued to do so over the following 13 months. Over the entire 16-month period, the percentage of subcontract drivers with acceptable safe driving scores increased from around 70% to approximately 100%. The author asserts that this improved safe driving practice was associated with a decrease in crashes, but no supporting data on the size of this decrease were presented. Driver monitoring with management follow-up seems to have produced improvements in driving behaviour among subcontractors.

Murray et al [33] describes a best practice case study of the implementation of a number of fleet safety initiatives at Wolseley in the UK, the world's largest heating and plumbing distributor and a leading supplier of building materials. The WIPE fleet safety process model was used to guide the implementation of fleet safety management practices (i.e. **W**hy focus on fleet safety (i.e. societal, business, legal & financial); **I**nitial and continuing status review using audits, focus groups, data analyses, surveys; **P**ilot, implement and change management countermeasures; and **E**valuation). Numerous initiatives were implemented over a 5-year period, such as the development of fleet policies, driver handbooks, driver risk assessments, awareness raising of road safety and benchmarking of safety performance. Improvements were demonstrated in fewer injuries, collisions and lost work-days, significant cost savings, and improved safety audit performance over time and compared to an all-fleet average.

Janssen Pharmaceutical Ltd in the United Kingdom (UK) introduced a suite of measures in 1984 to reduce fleet car crashes [34]. These included:

(i) a training program with a mandatory defensive driving seminar and supervised on-road training session for all new staff, routine follow-up training every 2 years and targeted follow-up training for individuals with safety breaches, manager training about the campaign, and making managers accountable for training delivery;

(ii) an incentive program that rewarded periods of crash-free driving with non-monetary awards/prizes;

(iii) improved vehicle safety including fitting of antilock brakes and Zero Ice detectors, routine media scanning to identify other emerging safety technologies, and spot maintenance checks by independent engineers; and

(iv) a road safety awareness program including circulation of accident statistics to managers and distribution of road safety articles to staff.

Crashes were reduced from 0.64 per vehicle in 1983 to 0.35 per vehicle in 1989.

Research findings from case study evidence have two main limitations. First, without a control group, it is not possible to be absolutely certain that observed changes in the case organisation are due to the intervention. They may have occurred anyway, as a result of other factors. Second, because a single case organisation or group is studied and because that organisation is usually self-selected, there is no guarantee that the results will be able to be generalised to any other organisation or even to other worksites within the same organisation. These limitations do not invalidate the case study findings but considerable caution is needed in interpretation. For example, although the case studies by Al Kurdi et al, Matusalen et al and O'Connell [30-32] reported improved behaviour or safety outcomes following fleet safety management interventions, the organisations operated in challenging environments against a social backdrop of poor traffic safety. It is not clear whether the interventions would produce similar improvements in other circumstances.

#### 2.2.1.4 Dimensions of fleet safety management considered in intervention studies

The fleet safety program dimensions identified as effective in intervention studies are summarised in Table 2.4. At best, the intervention literature provides a patchy guide to

effective practices. Some driver education and training activities have led to improved safety outcomes, as have incentives and rewards for safe performance. Behavioural monitoring of drivers has produced mixed results and the effects of feedback, counselling and sanctions require further investigation. ISO certification and multi-component safety systems have produced positive effects, but the necessary and sufficient components of these management systems cannot be distilled. Lastly, very little research has examined the impact of vehicle factors on fleet safety outcomes.

#### 2.2.1.5 Summary

There were a number of dimensions of fleet safety programs considered in the intervention studies identified in this literature review. These related to systems for auditing and accreditation, in-vehicle or self-monitoring, rewards for good performance in relation to safe driving, enhanced vehicle technology, driver training, and multifaceted programs that incorporated a range of fleet safety dimensions.

Overall, there have only been a small number of intervention studies conducted specifically with light vehicle fleets. Many of the intervention studies suffered from methodological flaws that made interpretation of the results difficult. Some of the intervention research was conducted with mixed fleets (i.e. both light and heavy vehicles) or with heavy vehicle fleets only and it is not clear how well the results from these studies may generalise to light vehicle fleets as differences in exposure to both driving and the intervention elements may occur in different types of fleets.

In many of the studies, a sample of professional drivers was used and it is not clear how well their results may apply to the light fleet context where driving is often a secondary task. Again, differences in exposure to driving and the intervention elements are likely to vary between professional and light fleet drivers.

Several studies examined the impact of introducing multiple interventions to the same individuals within the one study. This type of multi-faceted approach makes it difficult to identify the dimensions of fleet safety that may or may not be having an impact on reducing crash rates as the effect of one dimension cannot be singled out. In addition, a couple of studies failed to standardise and/or monitor the implementation of the intervention. It is not clear to what extent the impact of the interventions might have been compromised or maximised by the features of their implementation. Also, it is likely that repeatability and successful adoption of these interventions in other organisations are likely to be affected. In some cases, the possibility of baseline-dependent effects (i.e. the worse the problem, the more improvement that is possible) makes it difficult to generalise research findings from case studies of specific organisations.

Several of the intervention studies did not include control groups in the design [21, 28], but a few studies did include a no-treatment, control group [20, 22-25]. Most of the control groups were passive in that they received no attention at all. Unless all participants are unaware of the intervention (e.g., drivers in Shinar [25]), studies really need an active (placebo) control condition to discount the possibility that study participation, rather than the content of the intervention, produced the observed effects. An active control group is exposed to the same contact with the study team as an intervention group, but is exposed to a benign intervention. Because Gregersen et al's [20] study demonstrated differential

effects from different interventions it has, de facto, demonstrated intervention-specific results.

**Table 2.4: Fleet safety program dimensions identified in intervention studies**

| | Intervention studies | |
|---|---|---|
| **Fleet safety program dimensions** | **Positive impact** | **Negative or no impact** |
| **Management, systems and procedures** | | |
| ISO9002:1994 certification | Naveh and Marcus [28] – heavy vehicle sector | |
| Multi-component bespoke programs | Matusalen et al [31]; Al Kurdi et al [30]; Murray et al [33]; Gray [34]; Sochon and Brisbane [29] | |
| **Monitoring and assessment** | | |
| In-vehicle monitoring without feedback | | Larson et al [22] |
| In-vehicle monitoring with feedback | Wouters and Bos [21] – overall;<br>O'Connell [32];<br>Larson et al [22] – feedback with independent review | Wouters and Bos [21] – light vehicle fleets only;<br>Larson et al [22] – feedback without independent review |
| Behavioural self-monitoring with feedback | Olson and Winchester [18];<br>Hickman and Geller [23] | |
| **Employee recruitment, training and education** | | |
| Driver training - manoeuvring, skid training, and commentary driving | Gregersen et al [20] | |
| Post-licence driver education (not consistent evidence) | Ker et al [16] | |
| Defensive driver courses (not consistent evidence) | Lund and Williams [17] | |
| Group discussion sessions on safety and seat belt use | Gregersen et al [20]<br>Lund and Aaro [19] | |
| **Performance-based incentives and disincentives** | | |
| Bonus/ group monetary reward for good performance | Gregersen et al [20] | |
| Immediate direct rewards for good performance | Geller et al [24] | |
| Delayed direct rewards for good performance | Geller et al [24] | |
| Indirect rewards for good performance | Geller et al [24] | |
| **Vehicle technology, selection and maintenance** | | |
| Advanced Brake Warning System | | Shinar [25] |
| **Vehicle journeys** | | |
| Group discussion sessions regarding road safety problems and solutions | Gregersen et al [20];<br>Geller et al [24] | |

### *2.2.2 Descriptive studies of the relationship between practices and outcomes*

Research that has examined the relationship between fleet safety management practices and outcomes, in terms of vehicle crashes, injuries or unsafe behaviour can provide useful evidence regarding practices that are associated with successful management of work-related vehicle safety. These research studies typically used surveys or employee interviews to gather data and analysed the correlations between different fleet safety or organisational practices and levels of safety performance.

#### 2.2.2.1 Dimensions of fleet safety management considered in descriptive studies examining the relationship between practices and outcomes

The fleet safety program dimensions identified in descriptive studies examining the relationship between practices and outcomes are summarised in Table 2.5.

Lynn and Lockwood [35] surveyed 25,000 UK companies (response rate 46%) and a sample of 80 drivers within each respondent company (response rate 68%) and found that of the company drivers surveyed, the frequency of accidents while driving for work was 0.10 and for non-work driving was 0.08. Younger, less experienced drivers appeared to have a greater accident liability than older, experienced drivers. Company car drivers had about 50% more accidents than ordinary drivers when differences in demographics and exposure were taken into account. Around 11% of drivers reported undertaking a course in car driving training and these drivers had an 8% lower accident liability than drivers who had not attended a driving course. Four percent of companies surveyed offered drivers a monetary award for not having an accident and drivers in these companies were found to have 21% fewer accidents. Eight percent of drivers drove more than one car or van as part of their job and these drivers had a 41% reduction in accidents, corrected for exposure and driving experience. There was no evidence found that accident liability was associated with type of firm, if the person was employed as a professional driver, or if the driver had a supervisory role.

To confirm, in an Australian sample, the greater crash involvement of people driving for work [35], Newnam et al [36-37] surveyed 204 drivers from one private and three public organisations. Driving exposure, crash and traffic offence history, and current driving practices (based on the Driver Behaviour Questionnaire) were elicited separately for work and private driving. Known employer policies and practices around safe driving, and demographics were also measured. Crash rates calculated per 1,000km, but not traffic offences, were higher during work-related driving. In contrast, dangerous driving behaviours, speeding, and water and tyre checking were more likely done in a private vehicle than a work vehicle. Parallel organisational differences in safety policies and safe driving behaviours were observed, suggesting that organisational safety culture may be effective in shaping safe behaviour. This study did not appear to distinguish at-fault crashes and not-at-fault crashes. Combined with the fact that work-related driving tends to occur during the daytime when traffic exposure is highest, the failure to separate crashes by fault may explain the apparently higher work crash rate in the face of apparently safer driving behaviour.

**Table 2.5: Fleet safety program dimensions identified in descriptive studies examining the relationship between practices and outcomes**

| Fleet safety program dimensions | Outcomes | Descriptive studies |
|---|---|---|
| **Management, systems and procedures** | | |
| Strong safety culture | company active in driver safety – self report | Downs et al [38] |
| Driving or distribution as the main organisational or group activity | company active in driver safety – self report | Downs et al [38] |
| Transport of expensive or dangerous materials | company active in driver safety – self report | Downs et al [38] |
| Concern for company image | company active in driver safety – self report | Downs et al [38] |
| Concern for employee well-being | company active in driver safety – self report | Downs et al [38] |
| Management commitment to health and safety | unsafe behaviour – self-report | Machin and De Souza [39] |
| Driving exposure | crashes – self-report | Darby et al [40] |
| Compliance with crash reporting regulations | crashes & injuries | Moses and Savage [41] |
| Compliance as measured by safety and roadside audits | crashes | Moses and Savage [42] |
| Safety director with driver hire/fire authority | crashes & injuries | Moses and Savage [41] |
| More extensive policies and practices | unsafe behaviour – self-report | Newnam et al [36] |
| Fleet managers perceptions' of organisational safety values affects drivers' perceptions of safety values, safety motivation and crashes | company safety values – self report | Newnam et al [43] |
| Safety rules, management commitment, work pressure and communication aspects of safety climate differentially predict distraction/fatigue, violations and aggressive driving, driver errors and pre-trip maintenance activities | unsafe behaviour – self-report | Wills et al [44-45] |
| Safety climate | behavioural intentions & unsafe behaviour – self-report | Wills et al [44, 46] |
| Work overload | insurance claims | Cartwright et al [47-48] |
| **Monitoring and assessment** | | |
| Participation in accreditation scheme | insurance claims | TruckSafe [49] |
| Eyesight check | crashes – self-report | Darby et al [40] |
| Licence checks | crashes – self-report | Darby et al [40] |
| Monitoring hours of service | crashes & injuries | Moses and Savage [41] |

| Fleet safety program dimensions | Outcomes | Descriptive studies |
|---|---|---|
| **Employee recruitment, training and education** | | |
| Independent verification of driver credentials at hiring | crashes & injuries | Moses and Savage [41] |
| Driver training and lower accident liability | crashes – self report | Lynn and Lockwood [35] |
| Driver education | safety climate – self-report | Banks et al [50] |
| Higher driver safety policy awareness (but policy awareness likely post-dates crash) | crashes – self-report | Darby et al [40] |
| Fleet manager newsletter style and content | attitudes and practices – self-report | Newnam et al [51] |
| **Driver characteristics** | | |
| Older, experienced drivers less accident liability than younger drivers | crashes – self-report | Lynn and Lockwood [35]; Darby et al [40] |
| Traffic citations related to accidents | crashes – self-report | Caird and Kline [52] |
| Fatigue related to dangerous errors | driving errors – self report | Caird and Kline [52] |
| Speeding related to fatigue and traffic citations | citations – self-report | Caird and Kline [52] |
| Work pressure and driving errors | crashes – self-report | Davey et al [53-54] |
| Uncertain or aggressive/impulsive/irresponsible personality self-description | crashes – self-report | Darby et al [40] |
| Poorer attitudes to safe driving | crashes – self-report | Darby et al [40]; Newnam et al [43] |
| | behavioural intentions & unsafe behaviour – self-report | Wills et al [44, 46] |
| Subjective norms on safe driving | behavioural intentions & unsafe behaviour – self-report | Wills et al [44, 46] |
| Attitudes + behavioural control + subjective norms | behavioural intentions | Newnam et al [37] |
| Anticipated regret | behavioural intentions | Newnam et al [37] |
| Poorer self-report driving behaviour | crashes – self-report | Darby et al [40] |
| Poorer hazard perception scores | crashes – self-report | Darby et al [40] |
| Poorer safe driving self-efficacy relate to crash involvement | crashes – self-report | Newnam et al [43] |
| Type of driver job moderates predictors of crash involvement | crashes – self-report | Darby et al [40] |
| **Performance-based incentives and disincentives** | | |
| Monetary reward for no accidents | crashes – self-report | Lynn and Lockwood [35] |
| Performance-based monetary incentives (but effect depends on broader payment practices) | crashes & violations | Shaw et al [55] |
| Disciplining drivers involved in ‘preventable’ crashes | crashes & injuries | Moses and Savage [41] |

| Fleet safety program dimensions | Outcomes | Descriptive studies |
|---|---|---|
| **Vehicle technology, selection and maintenance** | | |
| Drivers driving a variety of vehicles associated with low accidents | crashes – self report | Lynn and Lockwood [35] |
| Antilock Braking System associated with more crashes (but is likely a training issue) | crashes – self-report | Darby et al [40] |
| Breath alcohol ignition interlock devices | alcohol lock-outs | Bjerre and Kostela [56] |
| **Other** | | |
| Perception of safety measures providing financial benefit | company active in driver safety – self report | Downs et al [38] |
| Higher risk driving situations predict driving behaviour and behavioural intentions | behavioural intentions and unsafe behaviour – self-report | Wills et al [44, 46] |

In another paper, based on the same participants, Newnam et al [37] explored predictors of intentions to speed in work and non-work settings. Intentions to speed were generally low but higher in a personal vehicle than a work vehicle. Anticipated regret (guilt) was higher towards speeding in a work vehicle and normative referents (people whose opinion matters to the individual) were perceived as more supportive of speeding in a personal vehicle. Attitudes to speeding, perceived behavioural control over speeding and subjective norms together accounted for a small but significant amount of the variation in intentions to speed and anticipated regret improved predictive accuracy a little more. These factors were slightly better predictors of speeding intentions in personal vehicles. Unfortunately, the authors did not assess the separate contributions of attitudes, perceived control and subjective norms to speeding intentions.

Downs et al [38] in a review of the safety of fleet car drivers in the UK examined evidence for a 'fleet driver effect' and concluded that the effect did exist, with fleet drivers having poorer safety records compared to all drivers. As part of the review, interviews were conducted with eight fleet trainers, six fleet managers, and six insurance industry specialists. Respondents interviewed suggested that factors which may make a company more likely to be active in driver safety were: (i) a strong safety culture; (ii) having driving or distribution as a company's core business; (iii) companies that transported expensive or dangerous materials; (iv) concern for the company's image or 'green' issues; (v) perception of safety measures as providing financial benefits; and (vi) concern for employees well-being. On the other hand having a perception that the level of accidents and costs were acceptable identified companies that did not have active fleet safety policies. Overall, the review concluded that there was little evidence that the measures currently employed to improve fleet safety were effective, but that there were indications that fleet safety was more likely to be improved by the introduction of an integrated set of measures based on a strong safety culture within an organisation.

Caird and Kline [52] examined the influence of a variety of individual and organisational variables in driver crashes in a large organisation in Canada using a questionnaire (58% response rate). They found several relationships between the factors examined, including

that organisational support was found to be positively related to planning and that planning was positively related to environmental adaptations, but negatively related to on-the-job accidents and fatigue. They found that fatigue was positively related to dangerous errors and that speeding was positively related to fatigue and traffic citations, but negatively related to on-the-job accidents. Not surprisingly, traffic citations were found to be related to accidents.

Cartwright et al [47-48] surveyed 111 car drivers from four subsidiaries of a large UK retail company (47% response rate). The 53 drivers with insurance crash claims in the last 3 years were compared to the 58 drivers without claims. Drivers from the highest (n= 45) and lowest (n=22) claiming subsidiaries were also compared. The only factor distinguishing drivers with and without crashes was alcohol use. Factors distinguishing drivers from high and low claiming subsidiaries were lower job satisfaction, use of social support for coping with stress, greater physical and mental health symptoms, and exposure to all measured job stressors (i.e. intrinsic job factors, having a managerial role, relationships at work, career development, organisational climate and home/work interface). Regression of the number of crash claims on predictors identified poor time management, alcohol use, lack of social support, few management responsibilities, job dissatisfaction and stress from home:work interface as significant predictors of individual driver crashes. The top sources of stress reported by drivers at the highest claiming subsidiary were work overload (i.e. having far too much work) followed by lack of consultation. In combination, the results point to work overload as a root cause of crashes in this study.

Darby et al [40] investigated the relationships between self-reported occupational collisions over the previous three years and a host of driver variables including age, post-licence training, eyesight and licence checks, commuter driving only, risk exposure indices (i.e. hours and miles driven), attitudes to road safety, self reported driving behaviour, knowledge of road rules, hazard perception test scores, personality traits, awareness of safety policies, vehicle servicing and checks, antilock brake fitment and use, and type of job. The data were collected from 16,004 employees of a large UK telecommunications company and were gathered via an on-line risk assessment tool. Driver licence checks, eyesight checks and commute-only driving predicted not having a collision after adjusting for driving exposure. Collision involvement was predicted by poorer attitude, behaviour and hazard perceptions scores, and by youth. People describing their personality as uncertain or aggressive/ impulsive/ irresponsible were also more likely to report collision involvement. Greater awareness of safety policies and Anti-lock Braking System (ABS) fitment predicted increased collision involvement, too, but the authors argued that these effects reflected post-collision policy education and lack of ABS training. Despite being statistically significant, the group of predictors explained very little of the variance in collision involvement (8.9%). Not surprisingly, the pattern of predictors was replicated when only engineers/service workers, who comprised the bulk (62%) of the sample, were included in the analysis. For delivery/collection drivers, however, only driving exposure positively predicted collision involvement and for managers/ accounting drivers, only ABS fitment positively predicted collision involvement.

Machin and De Souza [39] using a cross-sectional design surveyed 91 taxi drivers (97% response rate) at taxi ranks in Brisbane and found that the amount of hazards taxi drivers encountered did contribute to the prediction of their physical health and emotional well-being, but not to unsafe behaviour. Hazards, displaying aggression, and perceptions of

management's commitment to health and safety were all significant predictors of the amount of drivers' emotional well-being, while aversion to risk-taking, aggression, and perceptions of managements' commitment to health and safety were significant predictors of driver's unsafe behaviour.

Davey et al [53-54] utilised four driving measurement tools to investigate the relationship between self-reported attitudes, behaviours, crash involvement and demerit point loss. There were 4,195 individuals from a large Australian company who volunteered to participate (35.7% response rate). A multivariate analysis of factors associated with self-reported crash involvement revealed that increased work pressure and driving errors were predictive of crash risk, after controlling for exposure.

Wills et al [44, 46] used a safety climate questionnaire and the Driver Behaviour Questionnaire (DBQ) to examine the association between safety climate and driver safety, as indicated by work-related driver behaviour, vehicle crashes, and traffic offences, in three organisations with large vehicle fleets. Around one-third of drivers responded. They found that safety climate, safety attitudes, exposure to higher risk driving situations and subjective norms were associated with work-related driver behaviour and behavioural intentions, but that these predictors were not associated with work-related vehicle crashes or traffic offences. The retrospective nature of the crash and offence data (covering the previous three years) and the failure to distinguish at-fault and not-at-fault crashes may have obscured any relationships with these outcomes. In further analysis of these 323 employees [45], overall safety climate scores predicted total driver behaviour scores, but only one of the six dimensions of climate (safety rules) was a significant predictor in its own right. The four individual subscales of driver behaviour – driver distraction (including fatigue and stress), traffic violations (including aggressive behaviours), driver error and pre-trip maintenance - were also predicted by safety climate scores, but the dimensions of climate that were significant predictors varied: driver distraction was related to work pressures, management commitment, and safety rules; traffic violations were related to safety rules; driver error was related to management commitment and safety rules; and pre-trip maintenance was related to communication.

Dimmer and Parker [57] investigated the psychological processes underlying the accidents had by company car drivers. The DBQ was completed by 441 company car drivers (response rate 40.1%). Of these respondents, 27% reported having an accident in the last 3 years (compared to 18% of the wider driving population), of which 20% were while driving for work purposes. From responses to DBQ items the authors identified that speeding was one of the most commonly reported behaviours by company car drivers. In addition, the authors identified that 'errors' and 'violations' were both likely to be considered errors by company car drivers, rather than indented violations.

Assuming that safety climate perceptions are a predictor of safety outcomes, Banks et al [50] examined the relationship between self-reported days spent in driver education per year and safety climate perceptions among 351 workers in an emergency service fleet. Driver education included "…any formal training in the control of emergency vehicles…" (p.344). Participants reporting some driver education had higher safety climate scores than participants reporting no driver education. In particular, participants in driver education perceived greater management commitment to safety, more appropriate work demands, and greater trust and communication than drivers who did not take part in driver education activities. Interestingly, driver education participation was unrelated to perceptions of the

appropriateness of education and rules. The study suffers from a low response rate (15%) and is not able to determine whether education participation influences safety climate perceptions, whether safety climate perceptions influence education participation, or if education and safety climate are both the result of other factors. No evidence was presented confirming the assumed relationship between safety climate scores and safety outcomes for this study.

Newnam et al [43] proposed a model of work-related crash involvement that sees crashes resulting from drivers' level of motivation to drive safely, which is influenced, in turn, by their: (1) attitudes to safe driving; (2) perception of their own driving self-efficacy (ability); (3) perception of their supervisors' safe driving values; and (4) perception of their fleet managers' safe driving values. Supervisors' and fleet managers' safe driving values, as perceived by a driver, are shaped by their own perceptions of organisational safety values. Survey data from 300 drivers, 88 supervisors and 52 fleet managers in six government agencies largely supported the model, with the exception that supervisors' perceptions of organisational safety values were not related to how drivers perceived the supervisors' values. Further, safe driving motivation was only affected by drivers' perceptions of supervisors' safe driving values when those values were consistent with the perceived values of fleet managers.

Two potential influences on fleet managers' attitudes and practices were assessed by Newnam et al [51]. Twenty four fleet managers in six government agencies completed a survey about the impact of a monthly newsletter with a road safety column and an insurance pricing package that calculated premiums on the basis of claim history. Self-reported impact of the newsletter was related to its style and content rather than the credibility of the source. Neither perceived purpose nor senior management feedback were related to the self-reported impact of the insurance scheme.

As part of a study of breath alcohol ignition interlock device adoption by Swedish commercial vehicle fleets, Bjerre and Kostela [56] examined one year's breath test results recorded for commercial fleets by two breath alcohol ignition interlock device suppliers. The fleets included a mix of heavy (70%) and light vehicles, totalling 1,268 vehicles. The results showed that 1,388 (0.19%) of the 721,883 attempted vehicle trips were prevented because the driver's blood alcohol concentration exceeded the legal limit (0.02%). The highest percentages of trips were prevented during the weekend period spanning Friday night to Monday morning where maximum rates of 0.72% were observed. The impact that breath alcohol ignition interlock devices had on crashes in the participating fleets was not assessed.

Lessons learned about safety management in the heavy vehicle sector may also be relevant. Although not all the practices in heavy vehicle safety management are relevant to the light fleet sector, a number of studies have examined management systems or general management practices that may be transferrable. An analysis of claims data from National Transport Insurance (the largest insurer of heavy vehicles in Australia) over a 5 year period showed that heavy vehicles that were accredited with TruckSafe had a claims rate, on average, 33% lower than heavy vehicles that were not accredited with TruckSafe [49]. However, it is not known whether the accredited heavy vehicle operators would not have had lower crash rates if they had not been accredited. In other words, they may have been safer operators whether or not they were accredited.

Moses and Savage [42] analysed 19,589 US heavy vehicle companies with safety compliance audits and roadside vehicle inspections data. Unsatisfactory safety compliance audit scores were associated with a 46% higher crash rate. The rate of vehicle violations was also a significant predictor of crash rate. The study indicated that standard safety compliance audits and vehicle inspections can provide valid indices of safety performance.

Moses and Savage [41] examined US federal compliance audit data on 13,053 heavy vehicle transport companies to determine the relationship between company practices and crashes and injuries. Basic company operating information and 75 standard audit questions were used as predictors. Lower crash and injury rates were associated with having a safety director with control over driver hiring and firing; use of independent sources to verify driver backgrounds before hiring; company compliance with crash reporting regulations; disciplining drivers involved in 'preventable' crashes; and monitoring driver hours of service. The compliance audits did not seem to improve industry safety performance over the pre-existing trend, but the threat of follow-up audits and sanctions for unsatisfactory audit results did appear to be related to improved performance.

Drawing on survey data from 379 US heavy vehicle transport companies, public financial reports and crash and violation records, Shaw et al [55] examined the effect of individual driver incentive payments on safety outcomes. Results showed that companies' use of individual performance-based incentive payments was associated with lower crash and out-of-service violations when there was high pay dispersion (range) among the company drivers. Low use of individual incentives was associated with better performance when pay dispersion was low. The results were interpreted to mean that overt and justifiable links between performance and pay, for example through performance incentives, promote good performance whereas pay inequalities that are not overtly performance-based do not promote good safety performance.

#### 2.2.2.2 Summary

Descriptive research that has examined the relationships between fleet safety practices and outcomes in terms of vehicle crashes, unsafe behaviour and/or injuries resulting from a vehicle crash have identified a number of dimensions of fleet safety that are reported to have an effect on outcomes. The dimensions that have been found to have a positive effect on outcomes include: management commitment to OHS, compliance with audits, policies, procedures and regulations, the company conducting eye sight and driving checks, providing financial rewards to drivers for having no vehicle crashes, disciplining drivers involved in preventable crashes, having driver hiring policies, and conducting driver discussion groups, driving training and education.

Certain driver characteristics have been associated with a higher number of vehicle crashes, driving errors and behavioural intentions. These driver characteristics identified from the literature include younger, less experienced drivers, drivers who are fatigued, aggressive, impulsive or irresponsible, drivers who speed, who are under considerable work pressure, have poor hazard perception, receive traffic citations or who have poor attitudes to safe driving.

Aspects of the vehicle driven have also been shown to play a part in crashes and violations. Vehicle breath alcohol ignition interlock devices successfully prevented a large number of

trips that would have breached blood alcohol laws. In addition, company fleet drivers who drive a variety of vehicles have been associated with having a lower number of self-reported vehicle crashes than drivers who drive only one company vehicle. Although ABS fitment was associated with increased crash involvement in one study, this result was attributed to insufficient training in ABS use, rather than to the technology per se.

Organisational factors like safety climate or safety culture, having driving and distribution as the main organisational activity, concern for company image and employee well-being are dimensions of fleet safety that have been associated with organisations that are active in promoting driver safety in their organisation.

The majority of the descriptive research that has been conducted to examine the relationships between fleet safety practices and outcomes has relied on obtaining information from questionnaires. Questionnaire data are prone to a number of potential biases. When drivers are asked to recall their driving history in a questionnaire, it is possible that some individuals may not remember their crashes, injuries, traffic violations or unsafe driving behaviours, resulting in recall bias [58]. It is also possible that some individuals may not have reported all driving infringements or unsafe behaviours in an effort to appear more safety conscious than they really are (i.e., social desirability bias). Furthermore, when all the measures used in a study are collected using questionnaires, 'common methods' bias may artificially inflate the relationships between measures.

Poor response rates are an unfortunate but increasingly common reality in applied survey research [59]. They threaten the representativeness and generalisability of the findings if responders and non-responders differ systematically on the variables of interest. In almost all the studies reviewed, the questionnaire and interview response rates were relatively low - often, less than 40% of individuals responded to questionnaires – raising questions about the validity of the findings. The study by Machin and De Souza [39] is the one exception, where the response rate from taxi drivers was almost 100%. However, this was a convenience sample of drivers who were waiting at a single taxi rank and may not be representative of all Brisbane taxi drivers.

Perhaps the most significant limitation of descriptive questionnaire studies is that only associations between fleet safety dimensions and outcomes can be made. No causal inferences can be assigned.

### *2.2.3 Characterisation of hazards*

There have been several reviews and organisational surveys conducted that describe the characteristics of work-related vehicle crashes and potential countermeasures from Australia, the UK and the US [7, 38, 60-64]. These descriptive reviews have identified characteristics of drivers, the journey, vehicles, organisations and work-related factors that have contributed to vehicle crashes.

#### 2.2.3.1 Dimensions of fleet safety management considered in research characterising fleet safety hazards

There were several individual factors that contributed to driver performance that were identified in reviews and other research studies. Younger drivers, particularly males, have

been found to be more likely to be involved in work-related vehicle crashes than older drivers [62-63]. Banks et al [65], too, found men were over represented in the injury-crash insurance claims of a large Australian fleet and had higher-cost crashes. However in this study, crash participants mirrored the age profile of the workforce.

Individuals with a greater level of education, those who were sensation seekers, individuals with less experience, those who had less risk perception, who were stressed or fatigued and had medical conditions, such as a visual impairment, all were found to be more likely to be involved in vehicle crashes [62, 66]. Fatal work-related crashes were more likely than other crashes to involve driver distraction or inattention and drivers falling asleep [67]. A lack of compliance with road rules by drivers was also viewed as contributing to occupational road risk [61]. Individual differences in driving style (such as situational awareness, emotiveness, and skill/confidence), perceptions of the importance of speed in crash causation and the priority given to time pressure over safety were related to reported speeding behaviour [66].

Journey factors, such as length of trip, the type of trip and frequency, weather and traffic conditions and time of day, have been associated with a higher risk of vehicle crashes or driver states, such as drowsiness, that are recognised crash precursors [60, 67-68].

Fleet vehicles have been found to be more powerful, newer and more expensive than privately owned vehicles [60]. These sort of vehicle characteristics can have an effect on driver behaviour, particularly in relation to speed choice [60-61]. However, there are perceived benefits from selecting vehicles with good vehicle crashworthiness ratings and that include safety features, such as airbags, electronic stability control devices and ABS brakes [61, 64, 69]. Mandatory Intelligent Speed Adaptation is a promising in-vehicle safety technology for regulating speed, but is likely to be resisted by drivers [70]. Inadequate vehicle maintenance has also been linked to an increased crash risk [63].

Organisational factors like attitude to and priority placed on safety, general safety culture, communication, driver selection and training opportunities, crash reporting systems, and crash reduction policies may play a role in shaping the behaviour of fleet managers [71] and influencing the safe driving behaviour of workers [60-61]. Some of these factors are reported to characterise the safest heavy vehicle fleets in the US, specifically: recruitment based on driver history (i.e. crash, violation, past employer), pre-service and in-service training around regulations and company procedures and driver incentive systems using monetary and recognition rewards for incident-free driving [72].

Work-related factors, such as time pressure, and in-car secondary behaviours, such as mobile phone use or eating/ drinking can have an effect on the ability of a worker to drive safely [60-61, 63]. Mobile phone use has been found to be more common during work-related driving than private driving, particularly among men with managerial, technical or professional roles for whom the vehicle serves as an extension of the office [73]. Rowland et al [74-75] investigated approaches and staff attitudes to fleet safety. Interviewed drivers felt that work time pressure, traffic congestion, fatigue, familiarity with journey route, poor visibility from vehicles, lack of vehicle suitability, and, in some cases, influence of colleagues impacted on their ability to safely drive a vehicle and contributed to vehicle crashes. In addition, drivers felt that emotional stress, whether related to work or to personal life, impaired their driving behaviour.

#### 2.2.3.2 Summary

Within light vehicle fleet research, several studies have attempted to describe the characteristics associated with fleet vehicle crashes. These characteristics have been summarised above and included factors relating to individuals including driving style or fatigue, the journey, such as length and duration of trip, fleet vehicles, such as crashworthiness, the organisation, such as safety culture, and factors related to the work environment, such as time pressure.

### *2.2.4 Implementation issues*

Barriers to the implementation of fleet safety management practices have been identified in several documents from the literature review. The implementation issues were largely identified from interviews or surveys of workers or OHS agencies.

#### 2.2.4.1 Implementation issues for fleet safety management practices

Barriers to the implementation of fleet safety management practices are summarised in Table 2.6. Following interviews with OHS agencies, Murray et al [76-77] identified several barriers to adopting good fleet safety management practices. These included that fleet safety was often not viewed as an OHS issue by organisations; that organisations were not using a risk management approach to identify and address hazards; that there had been limited worker consultation and training; that there was a poor understanding of OHS issues and commitment to fleet safety initiatives by senior managers; that these operations had been contracted out; and that there was a perceived lack of resources to address fleet safety. In addition, from surveys with 24 fleet managers from government agencies (response rate 36%), it appears that the fleet managers' perceived that their agency gave priority to efficiency over safety and that this may also be a barrier to better safety management practices [71].

Lancaster and Ward [62] in a telephone survey of Scottish workplaces found that the most common barrier to undertaking action to improve fleet safety was the time requirement for implementation of actions. In addition, worker attitude to road safety and the lack of guidance material for employers in relation to risk assessment practices were also viewed as barriers to improvements in work-related safe driving [62].

Austroads [78] identified five barriers (and potential solutions) to the implementation of best practice fleet safety practices in organisations and these include organisational beliefs that:

(i) we do not have a problem;

(ii) we have got it under control;

(iii) we do not know what to do about it;

(iv) we can not do anything about it; and

(v) it is not our problem.

**Table 2.6: Barriers to the implementation of fleet safety management practices**

| Implementation barrier | Studies |
|---|---|
| **Management, systems and procedures** | |
| Fleet safety not an issue | Murray et al [76-77]; Austroads [78] |
| Organisations not using risk management approach | Murray et al [76-77] |
| Limited employee consultation | Murray et al [76-77] |
| Organisational priority of efficiency over safety | Newman and Tay [71] |
| Poor understanding or commitment by management to fleet safety | Murray et al [76-77] |
| Contracting out of services | Murray et al [76-77] |
| Fleet safety is under control | Austroads [78] |
| Not possible to do anything about fleet safety | Austroads [78] |
| **Employee recruitment, training and education** | |
| Limited employee training | Murray et al [76-77] |
| **Driver characteristics** | |
| Worker attitude to road safety | Lancaster and Ward [62] |
| **Vehicle technology, selection and maintenance** | |
| Cost | Bjerre and Kostela [56] |
| Reliability | Bjerre and Kostela [56] |
| Perceived need | Bjerre and Kostela [56] |
| **Other** | |
| Perceived lack of resources for fleet safety | Murray et al [76-77] |
| Time to implement actions | Lancaster and Ward [62] |
| Lack of guidance material for employers | Lancaster and Ward [62]; Austroads [78] |

Bjerre and Kostela [56] surveyed 88 Swedish companies with breath alcohol ignition interlock devices installed on their fleet vehicles and about 130 companies without breath alcohol ignition interlock devices. Car fleets comprised 35% of the vehicles with breath alcohol ignition interlock devices, heavy trucks and buses were 44% and taxis were 12%. Companies who had not installed breath alcohol ignition interlock devices were less likely to suspect alcohol problems in their workforce (45% versus 64%) but experience of known drink driving offences was similar in the two groups of companies. Cost was cited as the reason most companies (61%) did not install breath alcohol ignition interlock devices. A quarter of companies did not feel alcohol was an issue for them, and 16% perceived the technology to be troublesome or unreliable. Employee acceptance was reportedly high and was believed to have risen with experience of the devices.

#### 2.2.4.2 Summary

In some instances, the implementation of fleet safety management practices in an organisation may not be an easy task. Information gathered from interviews and questionnaires from managers and workers have identified several barriers to implementing fleet safety initiatives. These have included management not recognising that fleet safety is an issue, little commitment by management for safety initiatives, the time required to implement safety initiatives, the lack of guidance material available on fleet safety initiatives, the perception that there is no room for improvement in the organisations' fleet safety practices, and limited training of workers and poor worker attitude to road safety. Some fleet safety initiatives involve improvements in fleet vehicle technology and selection which is often seen as a cost to an organisation, rather than a long-term cost-benefit investment in terms of reduced crashes and associated worker injuries.

### *2.2.5 Discussion and opinion pieces and other publications*

Discussion and opinion pieces typically focused on describing the experience of organisations or individuals who managed fleet vehicles and provided some strategies that these organisations had identified as successful for managing vehicle fleets. Articles on fleet safety management that appeared in industry media are also discussed here.

#### 2.2.5.1 Dimensions of fleet safety management considered in discussion and opinion pieces and other publications

The fleet safety program dimensions identified in discussion and opinion pieces and other publications are summarised in Table 2.7.

Wills et al [79] argued that the proximal cause of crashes and drivers' on-road behaviour should be seen as the result of a complex, interacting system of driver, management and organisational factors. In particular, they recommend fleet safety management must consider the impact of: organisational structure and processes; formal and informal beliefs about the role of driving in employees' job performance; formal and informal values; the content and communication of rules and procedures; and management commitment to fleet safety.

Stuckey et al [80] proposed a descriptive model to organise the literature on occupational light vehicle use and safety, including fleet safety. The model captured the various levels of influence on road crash likelihood: the driver/passenger, the vehicle, the driving environment, the organisational environment and the regulatory/policy environment. The authors concluded that insufficient, good quality research existed at most levels of the model. Newnam et al [81] joined the call for quality intervention studies in fleet safety management. Wills et al [82] comment that even simple studies monitoring industry uptake of existing fleet safety guidelines and tools have not been conducted, let alone evaluations of their impact. These authors believe that implementation of fleet safety management best practice is actually quite limited in Australia. They argue that adoption is hindered by the diversity of fleet management arrangements within organisations and the typical separation of fleet functions and safety functions into different parts of the management structure.

Mooren and Sochon [83] sought to catalogue the driver safety education resources available to, or in use by, organisations. After consultations with industry organisations and a review of public advisory materials, they concluded that bespoke programs were most commonly used in Australia, driver safety education materials were adopted haphazardly, and driver safety education programs and resources were rarely evaluated in any way. The authors identified a need for governments to develop evidence-based standards for effective occupational driver safety education resources and programs.

Murray et al [76] described various initiatives that have occurred in fleet safety in Australia in different organisations, including symposia on fleet safety, addressing change of responsibility and management accountability for fleet safety and benchmarking performance. They reviewed and integrated components of different safety promotion models to develop a four-stage best practice framework for fleet safety. The four stages included: (i) why focus on fleet safety; (ii) conducting an initial and continuing status review; (iii) piloting and implementing countermeasures; and (iv) evaluation. Murray et al [76] also considered the usefulness of different evaluation methodologies to examine the effectiveness of fleet safety management practices and considered that regular benchmarking of performance using multiple indicators, such as crash rates, costs and qualitative and proactive indicators, was an effective form of evaluation of fleet safety practices.

Austroads [84] estimated the benefits of different safe fleet vehicle purchasing policies using vehicle occupancy rates and vehicle crashworthiness ratings and forecasting the number of fleet vehicle crashes, minor to fatally injured workers, and costs associated with crashes and injury outcomes. Austroads demonstrated that having a vehicle purchasing policy that identified that fleet vehicles must have electronic stability control and side curtain airbags would potentially deliver crash and cost savings to society. Scully and Newstead [85] estimated that the cumulative benefit of introducing electronic stability control across the Australasian vehicle fleet would be greatest in the case of single vehicle crashes and crashes involving 4WD vehicles.

In the industry literature, fleet safety commentators have discussed the need for a proactive safety culture [86-87], driver monitoring and performance feedback [86-88], and meeting OHS and road traffic regulatory obligations [89], as well as careful driver selection [86-87], safety training [86-87, 90] and vehicle safety practices [87, 90] and use of objective data to target and monitor safety performance [86-87, 90].

Spear [87] recommended a broad range of practices to build safety culture including: management commitment in the form of clear policies and demonstrated involvement; the inclusion of regulatory requirements into policy; the establishment and communication of company safe driving rules; checking licences, driving violation records, references from previous employers, knowledge of road rules and driving skills during driver selection; annual driving and licence checks; substance abuse screening programs; induction and safety training for newly hired drivers including in-vehicle training, in-service driver training, supervisor and manager training; driver performance monitoring including ride-along drives and regular constructive feedback, coaching and recognition; pre-trip vehicle and load inspections; preventive vehicle maintenance programs; and standardised accident and incident reporting, investigation and review processes.

**Table 2.7: Fleet safety program dimensions identified in discussion and opinion pieces and other publications**

| Fleet safety program dimensions | Discussion and opinion pieces |
|---|---|
| **Management, systems and procedures** | |
| Build and maintain a fleet safety culture | Moser [86]; Spear [87] |
| Leadership and commitment by management | Tokyo Electric Power Company [91]; Schon [92]; Spear [87]; Wills et al [79]; Kedjidjian [90] |
| Preventive approach to crashes | Tokyo Electric Power Company [91] |
| Adaption of safety policies to each worksite | Tokyo Electric Power Company [91]; Schon [92] |
| Driver management policies | Tokyo Electric Power Company [91] |
| Policies and practices address regulatory obligations | Spear [87]; Murray [89] |
| Beliefs and values around work-related driving | Wills et al [79] |
| Organisational structure and processes | Wills et al [79] |
| Content and communication of rules and procedures | Wills et al [79] |
| Regular benchmarking of safety performance | Murray et al [76] |
| **Monitoring and assessment** | |
| Driver performance monitoring and feedback | Spear [87]; Brock [88]; |
| Collect and examine crash records | Tokyo Electric Power Company [91]; Schon [92]; Spear [87]; Kedjidjian [90] |
| Substance use screening | Spear [87] |
| Use a community telephone feedback service | Kedjidjian [90] |
| **Employee recruitment, training and education** | |
| Careful driver selection (e.g., examine employee driving history) | Moser [86]; Spear [87]; Brock [88] |
| Medical screening | Tokyo Electric Power Company [91]; Spear [87] |
| Develop driver risk profiles | Moser [86] |
| Focus prevention measures on high risk drivers | Moser [86]; Spear [87] |
| Driver training | Spear [87]; Brock [88]; Kedjidjian [90] |
| Supervisor and manager training | Spear [87] |
| Traffic/fleet safety manager | Tokyo Electric Power Company [91]; Schon [92] |
| Driver safety awareness programs | Tokyo Electric Power Company [91] |
| Fleet safety working groups | Schon [92] |
| **Performance-based incentives and disincentives** | |
| Performance incentives and rewards (tangible or recognition) | Spear [87]; Brock [88]; Kedjidjian [90] |
| **Vehicle management** | |
| Select vehicles with safety technologies | Kedjidjian [90]; Austroads [93]; Scully and Newstead [85] |
| Pre-trip vehicle inspection regime | Spear [87] |
| Preventive vehicle maintenance regime | Spear [87]; Brock [88] |
| Pre-trip load inspection regime | Spear [87] |
| **Other** | |
| Cost-benefit analysis of fleet safety practices | Moser [86] |

Moser's [86] tips for effective fleet safety management included checking an employee's driving record before hiring and at least annually during employment; developing risk profiles for all drivers using their traffic violations and crash data; doing a risk assessment on each driver and focusing prevention measures on high risk drivers; building and maintaining a fleet safety culture by issuing regular reminders about safe driving; and calculating the cost-benefit of fleet safety management practices to demonstrate an impact on the bottom line of fleet safety initiatives. Kedjidjian [90] recommended: (i) using crash and cost data to define the safety problem objectively; (ii) having top management approval and support of crash reduction initiatives; (iii) providing driver training – particularly defensive driving training; (iv) using integrated programs that combine elements such as pre-employment screening, disciplinary warning systems, financial incentives, and training; (v) using a community feedback telephone service together with formal driver feedback and sanctions; and (vi) purchasing vehicles with safety features (e.g. airbags, ABS brakes) and backing the technology up with policies and training in their use.

In contrast to multifaceted approaches recommended to industry by other commentators, Brock [88] adopted the position that driver behaviour is the prime cause of crashes, and argued that in-vehicle driver monitoring and feedback is likely to be more effective than driver selection, training, certification, incentive programs, and vehicle maintenance in reducing crashes. He cited as evidence a company where a 56% reduction in crashes was observed after installation of in-vehicle video monitors coupled with feedback to drivers.

A few publications described the development and implementation of fleet safety management systems, but did not report evidence of their effect. The Tokyo Electric Power Company [91] described the steps the company implemented to manage fleet safety in their organisation. These measures included: (1) acknowledgement that safety is a management responsibility; (2) the adoption of a preventive approach to crashes; (3) the adaption of safety policies to be relevant to each local worksite; (4) employing a traffic safety instructor at each worksite; (5) examining vehicle crash statistics on a routine basis; (6) employing driver management options like issuing a company driving license, performing eye sight examinations, conducting functional examination and psychological aptitude tests; checking tachometer readings and requiring drivers to use driving journals; (7) conducting traffic safety awareness programs, including targeting young drivers, wearing seat belts and pedestrian safety; and (8) implementing inventive traffic safety measures, such as issuing safe driving points; providing drivers with training on driving in ice and snow; learning from near-miss experiences; and creating a handbook for company drivers.

Sochon [92] and Gibbs [94] describe the *Fleetsafe* project that was conducted by the Southern Sydney Regional Organisation of Councils (SSROC). The initiatives undertaken as part of *Fleetsafe* included: the development of a fleet safety policy by each council and fleet safety guidelines; the collection of fleet safety data for evaluation purposes; the nomination of a senior manager from each council to lead the fleet safety effort; the development of *Fleetsafe* working groups in each council and an overall *Fleetsafe* steering group; the inclusion of *Fleetsafe* in business plans; and the formation of driver safety improvement teams in each council.

#### 2.2.5.2 Summary

There have been numerous discussion and opinion pieces published regarding light vehicle fleet safety. However, relatively few of the statements in these publications are supported by good evaluative research. Several of these publications describe initiatives that have been implemented by organisations, such as Tokyo Electric Power Company, in an attempt to improve fleet safety performance, but often no evaluation of the outcomes of these safety initiatives are conducted, nor when multiple initiatives are implemented at the same time is it possible to tease out which initiative, or combination of initiatives, has produced (or not produced) the desired results i.e. a reduction in fleet vehicle crashes.

Many of the dimensions of fleet safety programs that are identified in discussion and opinion pieces, such as a fleet safety culture, regular benchmarking of safety performance, various fleet management policies, driver selection practices, vehicle selection policies and regular vehicle maintenance, are quite likely to have an effect on fleet safety, but these dimensions have not been consistently or rigorously evaluated and consequently it is difficult to determine the exact impact of these management practices.

### *2.2.6 Guidance and audit materials*

Work-related road safety guidelines have largely promoted the adoption of the OHS risk management approach (i.e. hazard identification, risk assessment, identification of appropriate control measures and their implementation, monitoring and review) to reduce the frequency and severity of work-related crashes. The guideline materials identified also usually outline legislative responsibilities, road crash statistics, benefits to be gained from investing in road safety, and promotion of the need for consultation and input from workers in the management of fleet safety.

#### 2.2.6.1 Dimensions of fleet safety management considered in guidance and audit materials

The fleet safety program dimensions identified in guidance and audit materials are summarised in Table 2.8. In the US, the *Motor Fleet Safety Manual* produced by the National Safety Council [95] provided an overview of fleet safety management practices, such as accident investigation, driver selection and hiring, and fleet purchase and maintenance. The manual states that there are four main elements of a fleet safety program, including: (1) setting management standards and policies; (2) recording accidents, injuries, and fleet safety program results; (3) selecting, training and supervising employees; and (4) encouraging and rewarding improved performance through awards, recognition and other interest-sustaining activities.

Also in the US, the American Society of Safety Engineers have produced a Standard for *Safe Practices for Motor Vehicle Operations* [96]. The Standard is designed for fleet safety managers and sets forth recommended practices for the safe operation of motor vehicles owned or operated by organisations, including: definitions of terms; management, leadership and administration of vehicle safety programs; operational policies for vehicle safety; driver considerations; vehicle considerations; and use of incident reporting and analysis.

## Table 2.8: Fleet safety program dimensions identified in guidance and audit materials

| Fleet safety program dimensions | Guidance or audit material |
|---|---|
| **Management, systems and procedures** | |
| Leadership and commitment by management | *Safe Practices for Motor Vehicle Operations* [96]; *Fleet Safety Manual* [97]; UK guidelines [98-99]; *Safety Management System (SMS) Handbook* for bus and coach operators [100] |
| Safety responsibilities/ cooperation between departments | UK guidelines [98-99]; *Safety Management System (SMS) Handbook* for bus and coach operators [100] |
| Safety policies | *Safe Practices for Motor Vehicle Operations* [96]; *Fleet Safety Manual* [97]; UK guidelines [98-99]; *Safety Management System (SMS) Handbook* for bus and coach operators [100] |
| Systems and processes to manage safety | UK guidelines [98-99] |
| Systems in place to record accidents, injuries | *Motor Fleet Safety Manual* [95]; *Safe Practices for Motor Vehicle Operations* [96]; *Fleet Safety Manual* [97]; UK guidelines [98-99]; *Safer Motoring How to Guide* [101]; *Safety Management System (SMS) Handbook* for bus and coach operators [100] |
| **Monitoring and assessment** | |
| Audit and evaluation | *Safety Management System (SMS) Handbook* for bus and coach operators [100] |
| **Employee recruitment, training and education** | |
| Employee selection, training, education and supervision | *Motor Fleet Safety Manual* [95]; *Safe Practices for Motor Vehicle Operations* [96]; *Fleet Safety Manual* [97]; UK guidelines [98-99]; *Safer Motoring How to Guide* [101]; *Safety Management System (SMS) Handbook* for bus and coach operators [100] |
| Induction programs | *Fleet Safety Manual* [97] |
| Employee monitoring | *Safety Management System (SMS) Handbook* for bus and coach operators [100] |
| **Performance-based incentives and disincentives** | |
| Rewards for good performance | *Motor Fleet Safety Manual* [95]; *Fleet Safety Manual* [97] |
| Disincentives for poor performance | *Fleet Safety Manual* [97] |
| **Vehicle technology, selection and maintenance** | |
| Vehicle selection | *Safe Practices for Motor Vehicle Operations* [96]; *Fleet Safety Manual* [97]; UK guidelines [98-99]; *Safer Motoring How to Guide* [101] |
| Vehicle maintenance | *Fleet Safety Manual* [97]; UK guidelines [98-99]; *Safer Motoring How to Guide* [101] |
| **Vehicle journeys** | |
| Safe route identification | UK guidelines [98-99]; UK guidelines [98-99]; *Safer Motoring How to Guide* [101] |
| Risk factor management (e.g. speed, fatigue, weather, distractions) | *Fleet Safety Manual* [97]; *Safety Management System (SMS) Handbook* for bus and coach operators [100] |

In Australia, the *Fleet Safety Manual* [97] developed by the Federal Office of Road Safety (now Australian Transport Safety Bureau; ATSB), largely based on the US *Motor Fleet Safety Manual* [95], provided a foundation for Australian OHS and government authorities [102-108] who in the majority have recommend managing fleet safety using the seven step best practice approach. These seven core elements include:

(i) Fleet safety policy – the establishment of a policy regarding fleet safety that is backed by senior management who are fully commitment to occupational road safety;

(ii) Driver recruitment and selection – hiring of responsible, safe drivers;

(iii) Induction programs – for new drivers and supervisors regarding the organisations fleet safety policies and procedures;

(iv) Fleet selection and maintenance – selection of appropriate vehicles with good safety features and a well maintained vehicle fleet;

(v) Vehicle crash involvement – systems in place for vehicle crash reporting, investigations and crash monitoring;

(vi) Incentives and disincentives – processes in place for recognising both good and poor driving behaviour and drivers praised or penalised, respectively; and

(vii) Training and education – support for training and education initiatives that promote and engender safe driving.

The need to consider the management of specific risk factors on the road that could adversely affect fleet safety, such as vehicle speed, driver fatigue, mobile phone use, adverse road (e.g. unsealed roads) or weather conditions, drug and alcohol use, and in-vehicle distractions (e.g. GPS equipment, climate or music controls) were also recognised in Australia [101, 103-104, 106-107].

In the UK, five key management approaches are recommended for effectively managing work-related road safety [98-99]. These include:

(i) Policy - an OHS policy covering work-related road safety;

(ii) Responsibility – top level management commitment for work-related road safety;

(iii) Organisation and structure – cooperation between departments for work-related road safety responsibilities;

(iv) Systems – systems and processes in place to effectively manage work-related road safety; and

(v) Monitoring – the ability to monitor performance of work-related road safety policies.

When evaluating the risks identified using the risk management approach, the UK guidelines [98-99] recommend taking into account a number of factors, including the:

(i) driver – their competency; training needs; and fitness and health;

(ii) vehicle – its suitability for the task; its condition; its on-board safety equipment is in good working order (e.g. seat belts, airbags); safety critical information is readily available for drivers (e.g. tyre pressure); and vehicle ergonomics are taken into account prior to purchase; and the

(iii) journey – planning and identification of safe routes are conducted; schedules are realistic; there is enough time to complete the journey without placing undue pressure on drivers; distance to be covered is appropriate, without risking driver fatigue; and consideration is given to weather conditions.

Like the UK approach, the Australasian Fleet Managers Association's (AfMA) *Safer Motoring How to Guide* [101] advocates a risk management approach to fleet safety and proposes the same three key areas as the UK that should be addressed i.e. the (i) driver; (ii) vehicle; (iii) journey; with the addition of a fourth element, the (iv) incident. The incident element refers to the development and implementation of systems for vehicle crash reporting, investigations and crash monitoring.

The NSW Ministry of Transport has developed a *Safety Management System (SMS) Handbook* for bus and coach operators [100] based on eight elements for effective management of bus and coach fleet safety. These elements include:

(i) policy and commitment;

(ii) safety responsibilities;

(iii) risk management;

(iv) procedures and documentation;

(v) employee monitoring (including fatigue and drug and alcohol);

(vi) training;

(vii) incident management and monitoring; and

(viii) audit and evaluation.

The guideline outlines what actions are required to achieve each element and how to go about implementing the specified actions.

#### 2.2.6.2 Structure and intended audience of audit materials

Existing audit materials varied in length and in response requirements. Most were designed for the heavy vehicle sector (i.e. trucks and buses) and were designed to be completed by accredited auditors or by fleet safety managers. Queensland Transport published *Workplace Fleet safety – How to conduct a self audit* [102] designed for use by organisations with light vehicle fleets to assist them in identifying if they are using best practice fleet safety management strategies and, if not, to assist them in identifying how they could improve their practice. This resource has also been incorporated into several publications in Western Australia [27, 103, 107]. For each of the seven core elements identified as impacting on fleet safety management practices (see Section 2.2.6.1), between 5 to 33 sub-elements are listed that are designed to illustrate best practice. Tables are provided for

each of the seven core elements to provide an indication to organisations of what sub-elements are required to be achieved to move from 'best practice not in place' through to 'moving towards best practice' to ultimately achieving 'best practice'. There is also the option if an organisation implements the various recommended sub-elements of the program of applying to Queensland Transport to obtain bronze, silver or gold levels of achievement awards in relation to fleet safety management practices.

The NSW Roads and Traffic Authority (RTA) based their *Fleet Safety Self Audit* [109] on the Queensland Transport [102] self audit approach. However, their audit tool only used five elements: (i) accountability; (ii) OHS; (iii) safer drivers; (iv) safer vehicles; and (v) evaluation. Each element had between 2 to 8 sub-elements and an organisation is asked to indicate if they had achieved a sub-element and, if not, to list the actions required to meet each sub-element.

In 2008, Austroads published *Improving Fleet Safety – Guidance Material for Moving Towards Best Practice* [78] targeted to fleet operators of all commercial vehicles. The document consists of three checklists and a risk rating tool designed to assist organisations to assess their current performance in relation to fleet safety. The checklists assess organisational, driver, and vehicle components of fleet safety and requires simple tick box answers. Each checklist consists of between 21 to 29 questions and following completion the number of 'ticks' are summed to rate the organisations' fleet safety performance on a five-point scale.

There have been several accreditation and/or audit schemes developed for heavy vehicles in Australia. The National Heavy Vehicle Accreditation Scheme (NHVAS) has two compliance modules addressing: (i) mass management (8 elements with between 2 to 7 sub-elements each) [110]; and (ii) maintenance management (9 elements with between 1 to 7 sub-elements each) [111]. Each module is accompanied by an audit matrix, where auditors indicate if compliance with each sub-element is achieved, the evidence sighted for compliance, and, if compliance is not met, the steps to be taken to meet compliance.

Similar to NHVAS, the Western Australian (WA) Heavy Vehicle Accreditation Scheme also has two compliance modules. One in common with NHVAS that addresses maintenance management [112] and the other which addresses fatigue management [113]. The maintenance management module has 8 elements, with between 1 to 6 sub-elements for each element, and the fatigue module addresses 9 elements, with between 2 to 8 sub-elements for each element. The WA Heavy Vehicle Accreditation Scheme has an accompanying operator guide [114] that outlines a step-by-step approach to the accreditation scheme and contains examples of how to meet sub-element criteria outlined in the compliance modules.

TruckSafe is an industry audit and accreditation program for heavy vehicles. There is a mandatory core module [115], consisting of 4 main elements: (i) management (with 4 sub-elements); (ii) maintenance (with 8 sub-elements); (iii) training (with 3 sub-elements); and (iv) workplace and driver health (with 5 sub-elements). TruckSafe states the mandatory requirements for each element, which are assessed with an 'yes/no' response. If the element is not met, examples of how the element could be achieved are provided. There are also two 'stand alone' voluntary modules (not subject to audits) on mass management of heavy vehicles (with 8 sub-elements) [116] and retail logistics supply chain of contact (with 17 sub-elements) [117].

The Australian Logistics Council (ALC) are in the process of developing a framework that will outline the responsibilities and baseline levels of safety required for freight carriers and others involved in the transport and logistics chain, with a focus on heavy vehicles. A system of independent auditing is conducted to determine if an organisation complies with the elements specified by the ALC. At this stage, these elements include:

(i) legal compliance and chain of responsibility;

(ii) OHS risk assessment and compliance;

(iii) fatigue management, including scheduling, time slot flexibility, waiting time, queuing, and loading and unloading;

(iv) communication;

(v) safe load, including preparation, restraint, containment, mass, container weight declarations, and dangerous goods;

(vi) speed management;

(vii) equipment;

(viii) driver health/ drug and alcohol free workplace;

(ix) subcontractor assessment; and

(x) operational infrastructure.

The ALC have developed two responsibility matrices, one on the national logistics safety code and the other on the retail logistics supply chain code. Each matrix lists the baseline operational requirements to be met for the consignor, carrier and consignee for the 10 elements outlined above.

The NSW Ministry of Transport's handbook for bus and coach operators [100] (see Section 2.2.6.1) contains a sample audit report form which lists each of the eight SMS elements and their accompanying sub-elements (which range between four to six). A simple 'yes/no' is indicated in relation to compliance with each sub-element, with space to list supporting evidence of compliance or any corrective actions required to meet the sub-element criteria. In addition, the NSW Department of Transport and Infrastructure have developed a bus operator accreditation audit tool [118]. The tool consists of 13 sections and encompasses assessment on the eight SMS elements. The tool requires tick box yes/no answers and text responses to a range of questions in relation to a suitable standard of operation to achieve accreditation status.

The NSW RTA has developed the *Safer Work Driving* checklist which consists of 12 questions regarding an organisations' driving safety system that require 'yes/no' responses.

#### 2.2.6.3 Summary

Many of the existing guidance and audit materials are largely based on the *Motor Fleet Safety Manual* produced initially in the late 1960's by the US National Safety Council [95]. The core elements or dimensions in these publications have remained similar over time

across the various documents. These dimensions have generally encompassed the six broad areas of:

(i) management, systems and procedures;

(ii) monitoring and assessment;

(iii) employee recruitment, training and education;

(iv) performance-based incentives and disincentives;

(v) vehicle technology, selection and maintenance; and

(vi) vehicle journeys.

It appears that the initial manuals and guidance material were based on anecdotal best practices for fleet safety. As research evidence for fleet safety practices has become available, later guidance and audit materials have referred to and incorporated findings from research studies.

The existing audit materials have largely been designed for the heavy vehicle sector. Audit materials, such as TruckSafe or NHVAS, form an industry-based audit and accreditation scheme. These schemes have the capacity for self- or independent-audits to be conducted. There has only been one audit tool developed for assessment of light vehicle fleets. However, this tool was developed over 12 years ago, appears to be based on limited research evidence, and was not built into a framework that enabled different organisations to benchmark their performance.

### *2.2.7 Occupational Health and Safety management best practice*

Several characteristics have been found to be associated with a lower injury experience by an organisation [119]. Organisations where senior management were found to be interested and showed commitment to improving OHS performance were reported to have better safety performance than organisations where senior management was not committed to OHS [120-132]. Larger sized organisations [133] and organisations with good systems for recording injury [121, 127, 129] and effective health and safety committees [134] were identified as being better performers in relation to OHS (Table 2.9).

Implementing a systematic, risk management system to identify and control hazards has been associated with good OHS performance [121, 134-136], along with the existence of standard operating procedures [128, 132, 135-136], clearly identified responsibility for safety [136], and the completion of regular safety audits in an organisation [122, 124, 136]. The involvement and leadership of supervisors in OHS and injury prevention [122, 127-128, 132, 137-138], including OHS in manager's staff appraisals [123], and having good communication between management and workers [120, 122, 124, 136] are factors associated with organisations that were identified as having good OHS performance records.

Workplaces that have a positive safety culture [136, 139-145], that integrate OHS into general management systems [125, 127, 129], that emphasize continuous OHS improvement [127-129], that employ front-end hiring practices [146] and that show good utilisation of resources, production planning and monitoring [122] are identified as being good performers in relation to OHS.

Conducting safety training has been associated with good safety performance in an organisation [120, 124, 129, 132, 135-136, 147] as has the ability for workers to be consulted and involved in negotiations on health and safety issues [123-125, 136, 147-148]. Having a more experienced workforce [121, 123, 147-148] and a low worker turnover and absenteeism [122-124, 147] are also associated with good OHS performance.

**Table 2.9: Dimensions associated with overall lower injury experience**

| Dimensions | Studies |
|---|---|
| **Management, systems and procedures** | |
| Top management actively involved in safety and strong commitment to safety | Simonds & Saafai-Sahrai, 1977 [121]; Cohen, 1977 [120]; Smith et al, 1978 [122]; Osborn & Jackson, 1988 [149]; Shannon et al, 1996 [148]; Shannon et al, 1997 [124]; Gallagher et al [125]; O'Toole [126]; Hsu et al [127]; Glendon & Waring [128]; Emmett & Hickling [129]; Rundmo [130-131]; Hofmann et al [132] |
| Use of standard operating procedures | Gun & Ryan, 1994 [135]; Glendon & Waring [128]; Hofmann et al [132] |
| Good communication and good relations between management and workers | Cohen, 1977 [120]; Smith et al, 1978 [122]; Shannon et al, 1997 [124]; WorkSafe WA, 1998 [136] |
| Presence of effective health and safety committees and fewer complaints and serious citations by a health and safety body | Boden et al, 1984 [134] |
| Defining health and safety in every manager's job description | Shannon, 1998 [123] |
| Attendance of senior managers at health and safety meetings | Shannon, 1998 [123] |
| Involvement of supervisor in accident prevention | Smith et al, 1978 [122]; Simard & Marchand, 1994 [137]; Hsu et al [127]; Glendon & Waring [128] |
| Supervisor's leadership in OHS/ feedback provided by supervisors | Niskanen [138]; Hofmann et al [132] |
| Highly developed safety structures, comprehensive written procedures and clearly identified areas of responsibility for safety | WorkSafe WA, 1998 [136] |
| Integration of OHS into general management systems/ health and safety are part of doing business | Gallagher et al [125]; Hsu et al [127]; Emmett & Hickling [129] |
| Attitude of continuous OHS improvement/ continuous monitoring | Hsu et al [127]; Glendon & Waring [128]; Emmett & Hickling [129] |
| Emphasis on systematic safety management approach | Hsu et al [127]; Glendon & Waring [128] |
| Involvement of workers in decision making processes | Shannon et al, 1996 [148]; Shannon et al, 1997 [124]; Harper & Koehn, 1998 [147]; WorkSafe WA, 1998 [136]; Shannon, 1998 [123]; Gallagher et al [125] |
| Workforce participation in improving health and safety | Emmett & Hickling [129]; Rundmo[130-131] |

| Dimensions | Studies |
|---|---|
| **Monitoring and assessment** | |
| Regular safety audits conducted | Smith et al, 1978 [122]; Shannon et al, 1997 [124]; WorkSafe WA, 1998 [136] |
| Good injury record keeping/ OHS performance is measured/ Information regarding safety is readily accessible | Simonds & Saafai-Sahrai, 1977 [121]; Hsu et al [127]; Emmett & Hickling [129]; WorkSafe WA 1998 [136] |
| **Employee recruitment, training and education** | |
| Some association found between safety training of management and reduced risk of injury | Gun & Ryan, 1994 [135] |
| Retraining needs analysis for continuing competencies | Glendon & Waring [128] |
| Front-end hiring practices (good safety records of workers) | Vredenburgh [146] |
| More experienced workforce less likely to have an incident | Simonds & Saafai-Sahrai, 1977 [121]; Shannon et al, 1996 [148]; Harper & Koehn, 1998 [147]; Shannon, 1998 [123] |
| Trained workforce | Cohen, 1977 [120]; Gun & Ryan, 1994 [135]; Shannon, et al, 1997 [124]; Harper & Koehn, 1998 [147]; WorkSafe WA, 1998 [136]; Vredenburgh [146]; Emmett & Hickling [129]; Hofmann et al [132] |
| **Performance-based incentives and disincentives** | |
| Importance of health and safety in managers' annual appraisals | Shannon, 1998 [123] |
| **Other** | |
| Larger firm size | Salminen et al, 1993 [133] |
| Attitudes or perception of safety can be useful in identifying characteristics of the workforce's safety climate | Zohar, 1980 [139]; Dedobbeleer & Beland, 1991[141] and 1988 [140]; Coyle et al, 1995 [142]; Shaw & Blewett, 1996 [143]; Williamson et al, 1997 [144]; Hayes et al, 1998 [145]; WorkSafe WA, 1998 [136] |
| Use of accident cost analysis | Simonds & Saafai-Sahrai, 1977 [121] |
| Good management in the utilisation of resources and production planning and monitoring | Smith et al, 1978 [122] |
| Lower employee turnover and absenteeism | Smith et al, 1978 [122]; Shannon et al, 1997 [124]; Harper & Koehn, 1998 [147]; Shannon, 1998 [123] |

In comparison, several studies have identified characteristics of workplaces that are associated with an increased risk of injury. Stave and Torner [150] explored organisational pre-conditions for occupational accidents in the food industry and identified several pre-conditions for hand injuries in machinery operators which included deficiencies in the technical or physical environment and work organisation, insufficient communication and learning, a high level of responsibility in combination with low control, conflicting goals, and a gap between procedures and practice.

Both Hofmann and Stetzer [151], who examined factors affecting safety performance at a chemical processing plant, and Niskanen [138], who examined organisational, individual and

situational factors affecting safety in road maintenance, identified that work pressure was associated with unsafe behaviours in the workplace. Niskanen [138] also identified that carelessness, lack of knowledge about safe work habits, and incorrect recognition of difficult situations were important factors in the occurrence of workplace incidents.

Hoffmann and colleagues [132] outline several factors that they identified as adversely influencing safety in the processing industry. These factors include: speeding up work processes, failed communications, a perception that personal protective equipment is a sign of weakness, a perception that safety issues are someone else's concern, a perception that management is not committed to safety, a general lack of motivation regarding safety, not following work procedures, a lack of adequate training, poor feedback regarding OHS performance, insufficient goals regarding safety operations, poor monitoring of safety performance, lack of knowledge regarding risks, unfamiliarity with operator manuals, and insufficient knowledge of general plant workings.

Both Gallagher et al [125] and O'Dea and Flin [152] have identified barriers to the successful implementation of OHS management systems and practices in organisations. Gallagher and colleagues [125] identified the three main barriers to the successful implementation of OHS management systems as: (i) failure to meet conditions for OHS management system success by not customising the system to organisational needs, by imposing the management system without workforce consultation, and by having weak senior management commitment and poor employee involvement, and inadequate resources for implementation; (ii) the inappropriate use of audit and evaluation tools (i.e. conditions where these tools become an end in themselves, are governed by misplaced management objectives, and are conducted without sound auditor skills, standards and criteria); and (iii) application of OHS management systems in what could be described as unreceptive contexts, such as in organisations where there is a high reliance on individuals in precarious employment arrangements, including casual or part-time workers, and where there is a high worker turnover in small businesses that have limited resources.

O'Dea and Flin [152], in their investigation of the relationship between an offshore oil and gas installation managers' level of experience and style of leadership with their safety attitudes, identified several areas for improvement in relation to safety issues from their 200 interviews with managers. These areas included: standardisation of safety practices and procedures across the industry; improved workforce competency; and increased workforce involvement in OHS activities and decision making.

## 2.3 Conclusion

Not much research has been conducted to identify or evaluate effective fleet safety management practices since Haworth et al [7] reviewed the field eleven years ago. The research that has been conducted has been piecemeal in nature and often lacked methodological rigour, providing only limited, consistent empirical support for many of the dimensions of fleet safety practices that have been identified in the current literature review. There have only been a small number of intervention studies conducted with light vehicle fleets. Many of them suffered from methodological flaws that made interpretation of the results difficult. Descriptive research that has examined the relationships between fleet safety practices and outcomes in terms of vehicle crashes, unsafe behaviour and/or

injuries from a vehicle crash identified a number of dimensions of fleet safety that are reported to have an effect on outcomes. However, the majority of the descriptive research has relied on information from self-reported questionnaires and no causal inferences can be made.

Bearing these criticisms in mind, the dimensions that have been associated with good safety outcomes can be summarised as:

(a) Management, systems and procedures

- Management leadership and commitment for fleet safety;
- Company policies, guidelines or procedures that address fleet safety;
- Cooperation between departments in an organisation regarding fleet safety responsibilities (e.g. Human Resources and OHS);
- Systems to record information regarding any vehicle crashes or worker injuries;
- A risk management or preventive approach to vehicle crashes;
- A positive safety culture;
- Concern for the company's image;
- Consultation between management and workers regarding safety issues (i.e. involving workers in decision making); and
- Minimal contracting out of services.

(b) Monitoring and assessment

- Audits or evaluations of fleet safety practices (e.g. participation in an accreditation scheme or self-auditing);
- Driver performance monitoring and feedback (e.g. in-vehicle monitoring); and
- Analysis and review of past vehicle crash trends.

(c) Vehicle selection and maintenance

- Vehicle selection guidelines include safety features;
- Routine vehicle maintenance; and
- Pre-vehicle trip inspections.

(d) Employee recruitment, training and education

- Employee selection procedures (e.g. licence checks, eye sight checks, driver history);
- Employee induction training;
- Employee education and training (e.g. defensive driver training, manoeuvring);
- Driver safety awareness programs;
- Fleet safety newsletters; and

- Fleet safety working groups or discussion groups.

(e) Performance-based incentives and disincentives

- Rewarding drivers for good or improved vehicle safety performance (e.g. recognition, bonus); and
- Disincentives for drivers for poor or worse vehicle safety performance.

(f) Vehicle journeys

- Reviewing the route travelled by drivers for possible safety issues; and
- Use of risk management strategies to reduce the risk of vehicle crashes (e.g. for speed, fatigue)

(g) Driver characteristics

- Employment of older drivers versus younger drivers;
- Driver's attitude to safe driving/ road safety;
- Driver's road traffic violation history (e.g. speeding tickets); and
- A lack of work pressure on drivers.

The supporting evidence for best practices in fleet safety in Australia is also weak. In particular, there is little indication that the existing guidance and audit materials were based on research evidence. This means that there is a real need for evidence-based guidelines and related tools for fleet safety management in Australia.

The wider review of the OHS management field for dimensions that were found to be associated with good OHS performance in an organisation identified several relevant studies. However, a few of these studies suffered the same methodological flaws as the general fleet safety literature, such as a reliance on self-reported information and a lack of control and/or comparison groups. The general literature on OHS management systems overlapped considerably with the fleet safety literature in identifying the following dimensions of successful safety management:

(i) Management and supervisor interest and commitment to safety;

(i) Effective communication and consultation with workers and involvement of workers in safety management;

(ii) Clear responsibility for safety management and integration of safety with other management functions;

(iii) Systematic risk management processes, regular audits, good OHS recording systems and continuous improvement processes;

(iv) Standard operating procedures;

(v) Safety training;

(vi) Safety-relevant hiring practices;

(vii) Work environment and technology consistent with safety; and

(viii) Organisation of work (e.g., workload and pressure) consistent with safety.

Usually, these studies were more rigorous than those devoted solely to fleet safety. They provided indirect converging evidence from the general management of OHS in support of some dimensions of fleet safety management practice.

This review of the existing fleet safety management literature has found that although various aspects of fleet safety have been investigated, the research conducted has largely not been able to provide definitive evidence with which to draw conclusions regarding whether some strategies used to manage fleet safety are having a positive effect. As a result, it is difficult to determine with confidence which dimensions of fleet safety management actually reduce vehicle crashes. However, this review has provided an up-to-date summary of the research conducted on light vehicle fleets and identifies the dimensions of fleet safety that are likely to be associated with reduced vehicle crashes. It has also provided an indication of the areas where further research and evaluative work should be conducted in fleet safety to strengthen the evidence-base for effective fleet safety management practices.

In terms of methods, light fleet safety research should seek to measure the effects of controlled interventions wherever possible, and to compare these to changes in non-intervention control groups (both active and passive) over the same time period. Studies should also document and monitor the actual delivery of any intervention or active control program. In multi-component intervention programs, methods should be adopted that allow individual components to be assessed separately, perhaps by staging the introduction of different components. Achieving these standards in workplace research is extremely challenging but the empirical evidence base about best practice will be much more useful whenever these standards are attained.

In terms of research areas, there is clearly a need to validate the impact of emerging in-vehicle safety technologies on safety outcomes and the need for this type of research will be ongoing as new technologies are developed. Many safety technologies aim to eliminate or reduce driving hazards and so would be preferable to administrative controls, if they are shown to be effective. Despite the potential of technologies, the available research has suggested that issues like technology training, and the type of feedback or management system into which they are integrated should also be systematically studied because these things can determine whether the technology will be effective in practice. For example, well-designed studies of the impact of in-vehicle data recorders are needed under different types of behavioural feedback and sanction regimes.

# 3. Interviews – fleet managers and drivers

The review of the fleet safety management literature identified a range of organisational practices that promise to improve fleet safety performance. However, it is likely that some issues and practices that are in use in organisations have not yet been evaluated. It is also likely that fleet safety management practitioners can shed additional light on the effectiveness or otherwise of practices that have been examined in the scientific literature. For these reasons, the literature review was supplemented with information gained through interviews with sample of fleet managers. To develop a better understanding of the ways fleet safety management practices might be perceived by drivers, a sample of fleet vehicle drivers working in the same organisations was also interviewed.

## 3.1 Method

A convenience sample of fleet managers and fleet drivers in NSW were invited to complete a short semi-structured interview by telephone or in person, if practical, regarding fleet safety management practices at their organisation. Ethics approval was obtained from the UNSW Human Research Ethics Committee (HREC 10212).

Members of AfMA in NSW were invited to take part in the interviews. Managers responsible for fleet safety were sent an initial email by AfMA inviting them to contact UNSW investigators via email if they wished to take part in the research (Appendix 1). All 180 AfMA members operating in NSW were invited to participate, including small (<250 vehicles), mid-range (250-500 vehicles) and large (500+ vehicles) fleet members. Seventeen (9.4%) indicated they were willing to participate during the specified timeframe.

Once a fleet manager indicated their interest in taking part in the research, UNSW investigators sent the manager, a participation information sheet, a consent form and a brief background questionnaire about the company's fleet for completion (Appendix 2). The questionnaire elicited basic demographic information about: (i) the interviewee (position in the organisation, job tenure, age, sex), (ii) the fleet (number and type of vehicle, ownership arrangements, use as pool or dedicated vehicles), (iii) the drivers and driving (types of staff who use the fleet, kilometres driven, frequency of use), and (iv) fleet safety (crashes in the past year, the job or position primarily responsible for fleet safety and its location in the organisational structure). When the signed consent form and questionnaire were returned, the fleet manager was contacted by UNSW investigators to schedule a convenient time for the interview.

The list of interview questions was provided to the fleet manager prior to the interview (Appendix 3). Respondents were asked about: (i) fleet safety management practices they had implemented or experienced at their current organisation, the success or otherwise of these practices, and organisational factors that assisted or hindered fleet safety management, (ii) fleet safety management practices observed to reduce, or increase, crashes, (iii) fleet safety issues not addressed by current management practices, and (iv) the effectiveness of fleet safety management practices identified in the literature. The majority of the interview was conducted without prompts to ensure that participants' answers reflected their own experience rather than issues identified by the research literature. However, for the last interview question (iv above), fleet managers were prompted to comment on specific practices associated with good or poor fleet safety management in

order to assess the relevance of fleet safety management practices recommended by the literature. These prompts were not provided to the interviewees prior to the interview.

Fleet drivers were also recruited from the sample of participating AfMA fleet members. Fleet managers were asked to provide copies of participant invitation letters and consent forms to ten of the people who drove a fleet vehicle at their organisation during a one week period. If the drivers agreed to take part in the research and be interviewed, they simply returned the signed consent form directly to UNSW investigators, with their contact details. Each driver was then contacted by UNSW investigators and a convenient time scheduled for the interview. The list of interview questions was provided to the driver prior to the interview (Appendix 4) together with a brief background questionnaire about his/her driving experience for work (Appendix 5).

The background questionnaire asked for basic demographic information about the drivers (job in the organisation, job tenure, age, sex, licence tenure), about their typical fleet vehicle driving experience (type of vehicle, frequency and distance of driving, ownership and use arrangements, crashes in the past year), and the job or position primarily responsible for fleet safety.

The driver interviews contained questions analogous to those asked of the fleet managers. Like the fleet manager interviews, the majority of the driver interviews were conducted without prompts. However, in order to assess the relevance of the recommended fleet safety management practices from the literature, drivers were prompted with specific practices associated with good or poor fleet safety management in the last interview question. All interviews were conducted by one author (LM).

## 3.2 Results

### *3.2.1 Fleet manager participants*

Fleet managers from 17 organisations initially volunteered to take part. Two later withdrew and interviews were conducted with the remaining 15 managers.

Almost all of the respondents (n=13; 86.7%) held positions specialising in fleet or transport logistics management. The remainder held management positions in risk management or environmental health and safety. As a group, the interviewees were quite experienced in their work roles. They averaged 6.8 years (SD=5.6) in their current position and a total of 12.6 years (SD=9.0) in such positions across their careers. The participants came to their current role with backgrounds in fleet management (46.7%), administration and management (33.3%), and mechanical engineering/design or mechanical trades (26.7%). Some participants also reported backgrounds in OHS (6.7%), transport logistics (13.3%) and operations (13.3%). On average, the respondents were 46.7 years old (SD=7.7), ranging from 30 to 60 years, and most were male (80%).

### *3.2.2 Fleets*

Fleet managers' answers to the background questionnaire were summarised to develop an understanding of the nature of their fleet, its use and management. The participating organisations came from a range of different industry sectors, shown in Table 3.1.

**Table 3.1: Participating organisations broken down by industry sector**

| Type of organisation | n | % |
|---|---|---|
| Local council | 5 | 33.3 |
| Government agency | 1 | 6.7 |
| Utility or service organisation | 4 | 26.7 |
| Commercial organisation | 3 | 20.0 |
| Educational institution | 2 | 13.3 |
| *Total* | *15* | *100.0* |

Table 3.2 summarises the composition of the light vehicle fleets under management. Participating fleets contained a median of 305 light vehicles (range 83 - 2700), and were distributed quite evenly across smaller (≤250 vehicles), medium (251-500 vehicles) and larger (>500 vehicles) fleet categories.

Passenger vehicles (cars, station wagons, 4WDs and SUVs) occurred in all the light vehicle fleets, and made up more than half of the vehicles in each fleet, on average. Utes/twin cabs and light commercial vans were commonly included in the fleets as well, but utes and twin cabs typically comprised a much bigger percentage of the fleets than vans. Light trucks and buses, motorcycles and quad bikes were also a component of some fleets.

On average, around half of the fleet vehicles were owned by the organisation and half were leased, but there was large variation in these percentages between organisations, including fleets that were entirely owned and others that were entirely leased.

In addition to fleet vehicles, two thirds of the organisations (n=10) entered into novated lease arrangements with staff. The average number of novated lease vehicles was 114 (SD=97.3) at the seven organisations that provided this information. Two thirds of the organisations (n=10) also allowed staff to use privately owned vehicles for business purposes.

As well as their light vehicle fleet, over half of the participating organisations (60.0%) also ran some heavy (>4.5 tonnes) vehicles. The median number was 103 heavy vehicles (trucks and/or buses) per organisation, but numbers ranged from 1 to 600.

Table 3.3 summarises the use of fleet vehicles within the participating organisations. All participating organisations had a pool of fleet vehicles accessible to many staff, but most also had vehicles that were dedicated exclusively to particular staff members. Although pool vehicles tended to make up more than half of the vehicles in the fleets, there was, again, much variation between organisations.

**Table 3.2: Composition of light vehicle fleets**

| **Fleet characteristics** | | | |
|---|---|---|---|
| Light vehicle fleet size | *Number of fleets* | | *% of fleets* |
| ≤250 vehicles | 6 | | 40.0 |
| 251-500 vehicles | 4 | | 26.7 |
| >500 vehicles | 5 | | 33.3 |
| | | | *Median vehicles* |
| Number of vehicles per fleet | 15 | | 305 |
| Types of light vehicles | *Number of fleets* | *Number of vehicles per fleet (median)* [b] | *% of fleet vehicles (mean (SD))* [c] |
| Passenger vehicles [a] | 15 | 191 | 57.2 (25.7) |
| Utes/twin cabs | 13 | 119 | 31.2 (22.3) |
| Light commercial vans | 14 | 13 | 5.8 (6.2) |
| Light trucks | 10 | 29.5 | 4.7 (4.6) |
| Light buses | 7 | 2 | 0.4 (0.9) |
| Motorcycles | 5 | 3 | 0.6 (1.2) |
| Other | 1 | 31 | 0.2 (0.6) |
| Vehicle ownership arrangements | *Number of fleets* | *% of fleets* | *% of fleet vehicles (mean (SD))* [c] |
| Purchased | 12 | 80.0 | 51.2 (44.7) |
| Leased | 11 | 73.3 | 48.7 (44.6) |
| Short-term hire | 1 | 6.7 | 0.07 (0.26) |

[a] Includes sedans, station wagons, 4WDs, SUVs.
[b] Fleets in which the number of a type of vehicle was zero were not used in the calculation of medians.
[c] Fleets in which the percent of a type of vehicle was zero were used in the calculation of means.

Participating fleets averaged about seven and a half million kilometres per year, but the range was very large (667,436 to 65,000,000 km) reflecting the different fleet sizes and fleet tasks. The distance travelled per vehicle per year was around 27 thousand kilometres. Estimates of the annual distance driven per driver were somewhat lower at around 16 thousand kilometres. About a quarter of the participants (n=4) did not provide an estimate of the annual kilometres per driver, perhaps because this information was not routinely examined at their organisation.

The type of staff who use fleet vehicles will be shaped by the workforce profile and type of business undertaken at a particular organisation. Nonetheless, management and administrative staff were fleet vehicle users at all the organisations that answered this question. Most of the organisations who responded (91%) provided fleet vehicles to technical and trades staff, and around 62% provided vehicles for use by professional and para-professional staff. Technical and trades staff were clearly the biggest group of fleet vehicle users, followed by professional and para-professional staff and by 'other' staff such

as labourers, apprentices and so on. Fleet managers also reported that most staff who used fleet vehicles at their organisations did so frequently, on most days.

**Table 3.3: Light vehicle use in participating fleets**

| **Vehicle use** | | | |
|---|---|---|---|
| Vehicle allocation method | *Number (%) of fleets using allocation* [a] | *Number of vehicles per fleet (median)* [b] | *% of fleet vehicles (mean (SD))* [c] |
| Exclusive to a single user | 11 (84.6) | 100 | 46.0 (43.1) |
| Pool vehicles | 14 (100) | 129 | 58.2 (40.7) |
| Travel distances | *Number of fleets* | *Median km* | *Mean (SD) km* |
| Total annual km for fleet | 14 | 7,653,000 | |
| Annual km per vehicle | 15 | 27,000 | 24,165 (6957) |
| Annual km per driver | 11 | 16,129 | 19,292 (9254) |
| Type of staff using fleet vehicles | *Number (%) of fleets with types of staff* [a] | | *Number of staff per fleet (median)* [b] |
| Management/Administrative | 12 (100) | | 72.5 |
| Technical/trades | 10 (90.9) | | 320.0 |
| Professional/paraprofessional | 8 (61.5) | | 198.5 |
| Other (labourers, apprentices etc) | 3 (23.1) | | 100.0 |
| Sales | 3 (23.1) | | 20.0 |
| Professional drivers | 2 (14.3) | | 55.0 |
| How often staff use fleet vehicles | *Number of fleets* | | *% of drivers per fleet (median)* [c] |
| Most days | 13 | | 80.0 |
| Once or twice a week | 13 | | 5.0 |
| Fortnightly | 13 | | 5.0 |
| Occasionally | 14 | | 3.0 |

[a] Because some organisations did not provide estimates, percentages were calculated of the number of fleets who provided a response rather than the total number 15.
[b] Fleets in which the number of vehicles used was zero were not used in the calculation of medians.
[c] Fleets in which the percent of a vehicles used was zero were used in the calculation of means.

### *3.2.3 Fleet safety*

Regardless of fault, fleet vehicle crashes were a fairly common experience for the participating organisations. Fleet vehicle crashes without injury (i.e., property damage only crashes) were experienced by all organisations during the previous year (n=13). The median number per organisation in the last year was 52 (about one per week), but totals ranged from 18 to 550. Five organisations (41.7% of respondents) had experienced at least one fleet vehicle crash (range = 1 to 18 crashes) where a staff member was injured and four organisations (36.4% of responders) had experienced fleet vehicle crashes where a third party was injured (range = 1 to 6 crashes). Average company rates for injury crashes were

similar to the all-vehicle rate for the state of NSW as a whole, but companies reported a much higher average rate of property damage only crashes (Table 3.4). This most probably reflects the fact that state crash data are based upon police crash reports which underestimate property damage crashes.

**Table 3.4: Company crash rates**

| | Rate per 10,000 vehicles | Rate per 1,000,000 km |
|---|---|---|
| Injury crashes | | |
| NSW fatal and non-fatal injuries [a] | 43.2 | 0.3 |
| Company average – staff injured [b] | 43.0 | 0.2 |
| (95% CI) | (6.7-79.4) | (.03-.4) |
| Company average – others injured [c] | 41.4 | 0.2 |
| (95% CI) | (-12.1-94.9) | (-.04-.4) |
| Property damage only crashes | | |
| NSW tow-away crashes [a] | 53.7 | 0.4 |
| Company average | 2416.2 | 10.6 |
| (95% CI) | (1556.7-3275.8) | (6.7-14.5) |

[a] State data were extracted from *Road Traffic Crashes in New South Wales 2009* (Table 1, p.16) and *Road Traffic Crashes in New South Wales 2008* (Summary data for 2008, p.6) available from RTA Centre for Road Safety at http://www.rta.nsw.gov.au/roadsafety/downloads/crashstats2009.pdf and http://www.rta.nsw.gov.au/roadsafety/downloads/accidentstats2008.pdf. The most recent year with complete denominator data, 2008, was used.

[b] These crashes may also have involved injury to others.

[c] These crashes may also have involved injury to company staff.

When asked who holds the primary responsibility for fleet safety at their organisation, 73% of respondents identified the Fleet Manager. That is, most respondents (80%) identified their own position. Four respondents reported that responsibility was distributed between at least two positions (usually including the Fleet Manager and the OHS manager) and two respondents specifically mentioned a role for line managers. Interestingly, none of the respondents specifically identified senior management as having the primary responsibility in this area, although one organisation pursued the philosophy that fleet safety was everyone's responsibility.

The most senior position with primary responsibility for fleet safety was typically situated in the third (42.9%) or fourth (42.9%) tier of management with the remainder (14.3%) at the fifth tier. In only one organisation, did the position responsible for fleet safety occur in the same section (branch/division) as the position responsible for OHS more generally. Instead, these responsibilities typically diverged two or three tiers up the organisational structure.

### *3.2.4 Fleet manager interviews*

#### (i) Practices used to manage fleet safety in the company

All fleet managers reported using company policies and procedures to manage fleet safety in the organisation. Some companies also had specific policies for issues, such as fatigue management, alcohol and drug use, and mobile phone use while driving. The majority of companies had vehicle selection and purchasing procedures in place. These included specifying the Australian New Care Assessment Program (ANCAP) safety rating of vehicles, usually at four stars or above, and vehicle specifications, such as ABS brakes, dual airbags, vehicle colour. New technology features, either being retro-fitted or included in new vehicles, such as rear sensors or cameras, were reported by a few managers as a specific practice used to manage fleet safety. Regular maintenance and servicing of vehicles was also indicated as a practice used to manage fleet safety by two fleet managers.

Half of the managers reported relying on near-miss and crash reporting and crash investigations to monitor trends and identify where improvements needed to be targeted to reduce 'at-fault' vehicle crash rates. However, one fleet manager reported getting limited feedback to assist in this risk identification process. It appears that in some companies, insurance companies provide information back to the company regarding vehicle claims made and, in some cases, the information provided to assist with targeting prevention strategies was limited. Two managers stated that reporting of vehicle defects assisted them to manage fleet safety. In addition, one manager reported that their company also conducted vehicle audits and regular random inspections. Five managers stated that they used information from crash reporting, along with driving history to identify 'risky' drivers to undertake remedial driver training.

Driver training was a practice often reported to be used to manage fleet safety. However, the type of training and its frequency varied widely. Driver safety awareness training was a popular practice to manage fleet safety. One company had mandatory driver training for all regular drivers every three years and remedial driver training for repeated driving offenders. Three companies conducted vehicle orientation and familiarisation training. One manager reported using behavioural-based risk avoidance training for fleet drivers, while another manager was using commentary driver training that involved a half day of theory and a half day of behind the wheel of practical on-road training where an individual's driving behaviour was commented on by an instructor. In addition, one company was conducting a young driver training program for the children of employees at the company.

A safe driving culture in the company was reported as a practice that assisted in the management of fleet safety by four fleet managers, with one manager stating that their company was beginning to focus on eco-safe (i.e. environmentally friendly and safety focus) driving. Regular communication with drivers, such as through the distribution of monthly safe driving pointers and tips, was identified by three managers as a practice that assisted them to manage fleet safety in their organisation. Driver's licence checks and fuel consumption checks were also reported to be used by one manager to assist in managing fleet safety.

### (ii) How successful have the practices used to manage fleet safety been?

Three fleet managers in companies that had implemented comprehensive fleet management programs, where safety was considered to be "just part of life" at the organisation, reported that they felt these programs had been a success by contributing to the reduction in vehicle crashes. However, one of these managers also reported that while their 'at-fault' vehicle crash rate had declined, their overall vehicle crash rate remained at a constant level. Three managers considered that specific practices, such as defensive driver training, implementing vehicle purchasing specifications and crash investigation processes, had been successful in managing fleet safety.

Two managers felt that it was hard to gauge what individual practices had been successful in the organisation in managing fleet safety. However, one of these managers reported that the company's vehicle insurance cost had decreased, which was one of the indicators that the company used to measure their fleet safety performance.

Four fleet managers felt that the practices that had been adopted to manage fleet safety had not been overly successful. In one of these companies vehicle crash statistics were reported to be on the rise. However, the majority of these crashes appeared to be at a low speed, such as while parking vehicles. One issue raised by three managers that they felt was impacting on the success of fleet safety management practices in their organisation was inconsistent supervisory and management support. In one of these organisations it was left up to individual departments as to how vehicle fleets were managed, which resulted in inconsistency across the organisation. For example, fleet vehicles in one department were fitted with reversing sensors, while vehicles in another department were not.

### (iii) Practices stopped because they were not effective in managing fleet safety

Only four fleet managers reported that they had ceased a practice as they did not think that the practice had been effective in managing fleet safety. In three instances, the practice involved ceasing driver training. One fleet manager stopped offensive driver training and another manager ceased generic defensive driver training to instead target behaviour-based risk avoidance training. The third company ceased specific 4WD terrain training.

The last practice that was ceased involved counselling drivers that had been involved in a vehicle crash. In this company when a driver was involved in a vehicle crash, regardless of fault, it had been mandatory for these drivers to be counselled in relation to the company vehicle safe driving policy. This practice has since ceased for company drivers who were not 'at-fault' in the crash.

### (iv) The three main factors that assist in managing fleet safety in the company

Fleet managers felt that the main factors that assisted them in managing fleet safety in their organisation were management and organisational commitment and cooperation; crash investigation and reporting practices; the use of safe vehicles with high ANCAP safety ratings; and the introduction and use of safe driving policies and practices in their organisation (Table 3.5).

**Table 3.5: Fleet manager opinions of the three main factors that assist or are a barrier to managing fleet safety**

| Main factors that assist in managing fleet safety | n | Main barriers in implementing practices to manage fleet safety | n |
|---|---|---|---|
| Management and organisation commitment and cooperation | 7 | Lack of resources for fleet safety | 5 |
| Crash investigation and reporting, having good data available | 6 | Poorly motivated staff and poor attitudes to fleet safety | 5 |
| Safe vehicles with a high ANCAP rating | 5 | Lack of management commitment to fleet safety | 5 |
| Introduction and use of safe policies and practices i.e. an effective management system | 5 | Lack of engagement by staff, apathy and a lack of accountability for driving behaviour | 3 |
| Good communication across the organisation, including staff feedback | 4 | Large size of company (e.g. problems of access) | 2 |
| Use of new vehicle technology (e.g. vehicle safety features) | 4 | Misconceptions regarding in-vehicle monitoring | 2 |
| Engagement of the workforce i.e. employees value safety | 2 | Lack of driver training | 2 |
| Strong safety culture in the organisation | 2 | Driver behaviour | 2 |
| Resources to implement fleet safety programs | 2 | Time pressures, including sales culture | 2 |
| Implementing practices i.e. putting safety into practice | 1 | Corporate structure, including the silo mentality of different company departments | 2 |
| Conducing observations of drivers | 1 | Lack of systems to put into place and knowing where to get information from | 2 |
| Conducting a licencing program with company drivers | 1 | Unknown fleet safety procedures by drivers | 1 |
| Having an OHS officer | 1 | Lack of understanding of the latest technology | 1 |
| Workcover requirements | 1 | Staff turnaround | 1 |
| Affiliation with AfMA | 1 | Use of both company and personal vehicles for work purposes | 1 |
| Driver education and accountability | 1 | Perception of driver training | 1 |
| | | Lack of communication | 1 |

### (v) The three main barriers in implementing practices to manage fleet safety

The main barriers to implementing practices to manage fleet safety stated by fleet managers were: a lack of resources for fleet safety; poorly motivated staff and poor attitudes to fleet safety; and a lack of management commitment to fleet safety (Table 3.5).

### (vi) Practices used to manage fleet safety that reduce the risk of fleet vehicle crashes and related injuries

Around three-quarters of the fleet managers felt that the supply and use of safe vehicles with high ANCAP safety ratings and the use of relatively new technology, such as reversing camera sensors, on-board monitoring, reduced the risk of vehicle crashes and injuries. Half of the managers reported that, in their experience, driver training and education reduced the risk of vehicle crashes and related injuries, in particular, training in the forms of driver risk avoidance training, competency-based driver training, and defensive driver training. In addition, three managers reported that vehicle familiarisation training was successful in reducing the number of vehicle crashes.

Collecting information on vehicle crashes and near-misses and having a reporting system in place that incorporates crash investigation strategies was thought to decrease vehicle crashes and injuries, as long as there was leadership and management to act on the information reported and crash investigation findings. Having a company-wide focus on safety was thought to be a key feature in reducing vehicle crashes and injuries by three managers.

Having high visibility safety practices that linked back to company policies and also to relevant legislation was thought to be necessary by these managers as "for staff out in the field, the vehicle is their workplace, so employers have a duty of care". In one organisation, there was a requirement for drivers on long distance trips to stop and telephone in every two hours to force them to take a break from driving.

Two fleet managers reported starting to encourage fleet drivers to conduct risk assessments prior to driving; one in relation to trip planning, so as to identify where breaks in the journey would be taken to manage the risk of fatigue while driving and the other, in terms of whether vehicle usage was actually necessary. For example, by considering whether the task could be conducted through use of video conferencing facilities instead.

Several managers felt that some specific practices were associated with decreased vehicle crashes and injuries and these included: having safe driving criteria in annual staff appraisals; examining driver histories in relation to infringements prior to employment; random auditing and inspection of vehicles; and having an effective reward and disciplinary process for drivers with a low and high number of vehicle crashes, respectively. In addition, one company was encouraging environmentally-friendly driving practices, such as driving more sedately to conserve fuel and to also decrease vehicle running costs.

### (vii) The three essential practices to reduce the risk of fleet vehicle crashes

Fleet managers were of the opinion that the most essential practices to reduce the risk of fleet vehicle crashes were: driver training and education; crash investigation and reporting, including benchmarking; the use of safe vehicles with a high ANCAP safety ratings; having a culture of safety in the organisation; and an awareness and engagement with fleet safety by employees (Table 3.6).

**Table 3.6: Fleet manager opinions of the three essential practices to reduce the risk of fleet vehicle crashes**

| Essential practices to reduce the risk of fleet vehicle crashes | n |
|---|---|
| Driver training and education | 10 |
| Crash investigating and reporting, including benchmarking | 4 |
| Safe vehicles with a high ANCAP rating | 4 |
| Culture of safety, an organisation with a focus on safety | 4 |
| Awareness, engagement and attitude to fleet safety | 4 |
| Fatigue management practices | 3 |
| Driver knowledge of vehicle | 3 |
| Use of new vehicle technology | 1 |
| Appropriate resources for fleet safety | 1 |
| Good recruiting practices | 1 |
| Ability to identify and manage risk while driving | 1 |
| Executive and middle management leadership and commitment | 1 |
| Examination of vehicle usage (i.e. video conference instead?) | 1 |
| Adherence to safe driving guidelines | 1 |
| Accountability of drivers for their driving behaviour | 1 |
| Ability to modify driving behaviours | 1 |
| 3 second gap rule when driving behind another vehicle | 1 |

### (viii) Practices used to manage fleet safety that have increased the risk of fleet vehicle crashes

Several fleet managers were aware of practices that, in their opinion, increased the risk of fleet vehicle crashes. Four managers identified advanced driver, high performance training as likely to increase the risk of crashes. One manager also include the use of generic driver training courses as increasing the risk of vehicle crashes. Three managers identified certain vehicle safety features that they thought were likely to increase the risk of vehicle crashes. These were the use of intelligent cruise control, if the driver had not been trained in its use; reversing cameras, as sometimes drivers relied on the cameras only instead of using the vehicle's mirrors and turning and looking behind their vehicle; and features, such as ABS brakes, as one manager felt that if drivers knew that a vehicle with ABS was not going to skid, then drivers are more likely to brake at the last minute i.e. "I don't have to be careful as technology will avoid it for me".

The remaining practices that were thought by managers to increase the risk of vehicle crashes were: having no real yardstick for benchmarking purposes or standard safety program; using vehicles that had an ANCAP safety rating lower than four; use of dark coloured vehicles, as opposed to light coloured vehicles that are easier to see; allowing hands-free mobile phone use; and allowing the use of private vehicles for business as private vehicles have an unknown ANCAP safety rating and vehicle maintenance history.

### (ix) Areas where more could be done to manage fleet safety

Four fleet managers indicated the need to make drivers more accountable for their driving behaviours, including by incorporating driving behaviour into staff performance appraisals. One manager would also like to see awareness and engagement of staff on the consequences of vehicle crashes. For example, this manager felt that individuals become blasé or unaware of the potential impact that a 700 kilogram vehicle could have at 120 km/h.

Four managers thought that the use of behaviour-based driver training would be useful to manage fleet safety and one manager stated they also wished to incorporate vehicle familiarisation training at their company to assist in decreasing the risk of vehicle crashes. Three fleet managers indicated that more could be done to manage fleet safety by having complete support from senior management for fleet safety. The managers felt that this would allow them to "mainstream safety" and hopefully encourage staff to buy-in to the safety programs in the company.

Other initiatives that managers thought could be used to manage fleet safety included: using GPS monitoring systems to record information such as kilometres, speed, post-incident braking; doing more to improve visibility in vehicles, for example, the A pillar in vehicles is now very wide due to the installation of air bags and this can obstruct driver visibility; examining previous driving histories prior to employment; provision of information on how to properly use new vehicle technology e.g. ABS brakes; not allowing new vehicles on Australian roads unless they met with an appropriate ANCAP safety rating; having an 'engine on – phone off' policy; and having a company safety committee discuss the results of vehicle crash investigations.

### (x) Factors that may have an impact on fleet safety management

Table 3.7 describes the responses from fleet mangers when asked, in their experience, whether specific factors impacted on fleet safety management. Almost all managers rated aspects of management systems and procedures as having an impact on fleet safety management, except for contracting out of services, where around half (53.3%) of the fleet managers thought that this practice had an impact on fleet safety management.

Approximately three-quarters (73.3%) of fleet managers thought that conducting audits or evaluating fleet safety practices had an impact on fleet safety. Most (86.7%) managers viewed conducting driver performance monitoring and feedback as having an impact on fleet safety management performance, and almost all reported that analysing and reviewing past vehicle crash trends had an impact. Both having vehicle selection guidelines in place and conducting routine vehicle maintenance were rated by all managers as having an impact on fleet safety management. Fewer managers (around three-quarters) thought that conducting pre-trip vehicle inspections was effective in managing fleet safety.

Almost all managers thought that employee recruitment, training and education strategies were effective in managing fleet safety, except for the distribution of fleet safety newsletters, where fewer managers (around three-quarters) were of the opinion that this strategy was effective. There was a mixed response from managers regarding the use of rewards for good driving performance, with around two-thirds of managers of the opinion that this was an effective strategy to manage fleet safety. However, almost all managers

thought that disincentives for poor driving performance were an effective management strategy. Almost all fleet managers thought vehicle journeys and driver characteristics had an impact on fleet safety management, except for the employment of younger and older drivers, where the responses were varied.

**Table 3.7: Fleet manager opinions of factors that may have an impact on fleet safety management** (n=15)

| | Yes % | No % | Not known % |
|---|---|---|---|
| **A. Management systems and procedures** | | | |
| Management leadership and commitment for fleet safety | 100 | - | - |
| Having in place company policies, guidelines or procedures that address fleet safety | 100 | - | - |
| Having cooperation between departments in an organisation regarding fleet safety responsibilities (e.g. HR and OHS) | 93.3 | 6.7 | |
| Having a system in place to record information regarding any vehicle crashes or worker injuries | 100 | - | - |
| Adopting a risk management or preventive approach to vehicle crashes | 100 | - | - |
| The safety culture of an organisation | 100 | - | - |
| Concern for the company's image | 93.3 | 6.7 | - |
| Having consultation between management and workers regarding safety issues (i.e. involving workers in decision making) | 100 | - | - |
| Contracting out of services | 53.3 | 26.7 | 20.0 |
| **B. Monitoring and assessment** | | | |
| Conducting audits or evaluating fleet safety practices (e.g. participation in an accreditation scheme or self-auditing) | 73.3 | 6.7 | 20.0 |
| Conducting driver performance monitoring and feedback (e.g. in-vehicle monitoring) | 86.7 | 6.7 | 6.7 |
| Analysing and reviewing past vehicle crash trends | 93.3 | 6.7 | - |
| **C. Vehicle selection and maintenance** | | | |
| Having vehicle selection guidelines in place (e.g. ABS brakes) | 100 | - | - |
| Conducting routine vehicle maintenance | 100 | - | - |
| Conducting pre-trip vehicle inspections | 73.3 | 13.3 | 13.3 |
| **D. Employee recruitment, training and education** | | | |
| Using employee selection procedures (e.g. licence checks, eye sight checks, driver history) | 93.3 | - | 6.7 |
| Conducting employee induction training | 93.3 | - | 6.7 |
| Conducting employee education and training (e.g. defensive driver training, manoeuvring) | 93.3 | - | 6.7 |
| Driver safety awareness programs | 93.3 | - | 6.7 |
| Producing and distributing a fleet safety newsletter | 73.3 | 13.3 | 13.3 |
| Having fleet safety working groups or discussion groups | 80.0 | - | 20.0 |

| | Yes % | No % | Not known % |
|---|---|---|---|
| **E. Performance-based incentives and disincentives** | | | |
| Rewarding drivers for good or improved vehicle safety performance (e.g. recognition, bonus) | 66.7 | 20.0 | 13.3 |
| Having disincentives for drivers for poor or worse vehicle safety performance | 93.3 | - | 6.7 |
| **F. Vehicle journeys** | | | |
| Reviewing the route travelled by drivers for possible safety issues | 80.0 | 13.3 | 6.7 |
| Using risk management strategies to reduce the risk of vehicle crashes (e.g. for speed, fatigue) | 100 | - | - |
| **G. Driver characteristics** | | | |
| Employing older drivers | 20.0 | 66.7 | 13.3 |
| Employing younger drivers | 46.7 | 33.3 | 20.0 |
| A driver's attitude to safe driving/ road safety | 100 | - | - |
| A driver's road traffic violation history (e.g. speeding tickets) | 100 | - | - |
| Work pressure on drivers | 100 | - | - |

### *3.2.5 Fleet driver participants*

Drivers from 11 of the 15 participating organisations volunteered to take part in an interview. In 4 organisations, more than one driver volunteered. In total, 21 drivers were interviewed.

The driver participants most frequently held professional and para-professional (42.9%) or managerial and administrative (42.9%) positions within their organisation. Smaller numbers of participants held technical/trades (9.5%) or sales (4.5%) positions. Given the profile of drivers reported by managers for their fleets (see section 3.2.2), technical and trades workers appear under-represented among the driver volunteers.

The participating drivers had typically been with their current organisation for a considerable period (Median = 10 years) but the range was large (from 1 to 40 years). They had held their current jobs for a median of 5.5 years, but again there was quite a range of job tenures (from 1 to 28 years).

Most of the driver participants were male (76.2%). The average age of the drivers was 47.2 years (SD=11.8) and they had held a full drivers' licence for most of their adult lives (Mean = 29.4 years, SD=11.9).

### *3.2.6 Fleet driving*

Table 3.8 summarises the fleet driving experience of participating drivers. Two-thirds of the participants usually drove a fleet passenger vehicle (car, station wagon, 4WD/SUV). Far fewer drove utes/twin cabs or light commercial vans. One of the participants divided driving duties between a passenger vehicle and a light bus.

Typically, the participants were regular users of fleet vehicles. The majority (81%) drove fleet vehicles at least once or twice a week. Daily driving kilometres were typically low (under 50), nonetheless over a quarter of participants reported usually driving a fleet vehicle more than 100km per day. Notable percentages of the participants used pool vehicles, dedicated vehicles and vehicles held under novated lease arrangements, but pool vehicle use was the commonest way that drivers accessed their organisation's fleet.

**Table 3.8: Light vehicle fleet use by participating drivers**

| | *Number (%) drivers* |
|---|---|
| Type of light vehicle usually driven | |
| Passenger vehicles [a] | 14 (66.7) |
| Utes/twin cabs | 3 (14.3) |
| Light commercial vans | 3 (14.3) |
| Multiple types used equally often | 1 (4.8) |
| How often fleet vehicles used | |
| Most days | 14 (66.7) |
| Once or twice a week | 3 (14.3) |
| Fortnightly | 3 (14.3) |
| Occasionally | 1 (4.8) |
| Usual daily kilometres driven | |
| less than 50km | 8 (38.1) |
| 50-100km | 6 (28.6) |
| 100-500 | 6 (28.6) |
| Multiple distances driven equally often | 1 (4.8) |
| Vehicle allocation/ownership | |
| Dedicated for individual's use | 5 (23.8) |
| Pool vehicles | 9 (42.9) |
| Novated lease | 7 (33.3) |

[a] Includes sedans, station wagons, 4WDs, SUVs.

### *3.2.7 Fleet driver safety*

Only one of the participating drivers reported that they had been involved in a crash in a fleet vehicle in the last year. This crash had resulted in property damage only. The rate of 0.04 crashes per driver is within the range that might be expected for property damage crashes based on the driver and crash figures reported by the company managers (mean rate per driver = 0.22, 95% confidence interval = 0.02-0.42). None of the driver participants had been in an injury crash while driving a light fleet vehicle in the last year. Although this rate (0.00) is similar in magnitude to the range expected from the company managers' reports of staff injury crashes (mean rate per driver = 0.003, 95% confidence interval = 0.0006-0.0050), there were not enough driver participants to permit an accurate statistical

comparison of such small rates. Overall, the participating drivers appeared to have crash rates that were typical of the participating companies.

When asked who held the primary responsibility for light fleet safety management at their organisation, the drivers' responses mirrored those given by managers. That is, 81% of participating drivers considered that the fleet manager held primary responsibility. Two drivers reported that the responsibility was shared between the fleet manager and either the OHS manager or a committee devoted to safe driving, and one driver reported that the OHS manager alone was primarily responsible for fleet safety management. Consistent with the responses given by participating managers, none of the drivers felt that senior management held primary responsibility for light vehicle fleet safety.

### *3.2.8 Fleet driver interviews*

#### (i) Practices used by the company to ensure driver safety

Three-quarters of fleet drivers reported that safety policies, practices and programs were one of the main practices used by the company to ensure a driver's safety. These included policies that, for example, governed fatigue management strategies, drug and alcohol use, having the vehicle head lights on while driving, and environmentally-friendly driving. That the company purchased vehicles with a high ANCAP safety rating was indicated by five drivers as practices conducted to try and ensure a driver's safety. Five drivers indicated that having fleet vehicles regularly maintained also contributed to vehicle safety.

Five fleet drivers stated that the company conducting vehicle familiarisation training contributed to ensuring a driver's safety and four drivers considered that undergoing behavioural-based driver training or specific driver training tailored to driver needs, such as driving on ice and snow, was a practice used by the company to improve the safety of drivers. Having a fleet safety, or safe driving, committee was reported by three drivers as having an impact on the safety of drivers, especially when this committee was responsible (or as two fleet drivers indicated when company employees were responsible) for the review of the causes of vehicle crashes and implementing preventive activities.

Having clear strategies in place for drivers who had been involved in 'at-fault' vehicle crashes or who had received driving infringements was stated to be an important practice in ensuring safety by two drivers. For example, if a driver received a speeding ticket, or if a driver was involved in three or more vehicle crashes, they were required to be interviewed regarding the incident(s). Other initiatives that drivers reported were used by the company to ensure their safety were: having the company telephone number on vehicles, so members of the public could report poor driving behaviours; producing a fleet safety handbook for drivers; producing circulars related to safe driving; encouraging drivers to have regular breaks while long distance driving and encouraging drivers to stay at hotels, if necessary; ensuring all drivers had an appropriate driver's licence; and supplying first aid kits in vehicles.

### (ii) How successful have the practices used to manage fleet safety been?

Eight drivers felt that, in their opinion, overall the practices used by the company had been successful in managing fleet safety. In particular, two drivers felt that the vehicle orientation and familiarisation training had been very successful. One driver recognised that having a safe driving committee that was tasked with investigating vehicle crashes had been successful, and one driver stated that the company purchasing vehicles that had a five star ANCAP safety rating had contributed towards good safety practice.

Two drivers did not think that the practices used by the company had been successful in reducing vehicle crashes. One of these drivers pointed out that they had not been provided with vehicle orientation training, even though this was a company policy, so that they felt that gaps existed in safety procedures. One driver felt that drivers should be made more aware of safe driving practices and that this would assist the company to improve driving safety. Eight fleet drivers stated that they did not know if any of the practices that had been used by the company to manage fleet safety had been successful.

### (iii) Practices stopped because they were not effective in managing fleet safety

The majority of drivers were unaware of any practices that had been ceased because the company did not think they were benefiting the safety of drivers. However, two drivers were aware that advanced driving training courses for drivers had ceased being provided. In one company, vehicles with bull bars had been banned from being purchased. Another company that used vehicles that had lift doors on canopies to access equipment stored in the vehicle had stopped purchasing vehicles with canopy access on the right hand side, behind the driver's door, so as to encourage individuals to access equipment on the curb side away from advancing traffic. One driver stated that their company had started purchasing automatic 4WD vehicles for a period, but had since ceased and returned to purchasing manual 4WD vehicles. One driver stated that if a driver had had an 'at-fault' vehicle crash they used to get a letter from the company, but now if they had an 'at-fault' crash they were interviewed by the fleet manager regarding the crash. Lastly, in one company a driver stated that all new drivers used to be accompanied by an experienced driver for a period of time, but that practice was no longer conducted.

### (iv) The three main factors that are used to promote fleet safety

Fleet drivers were of the opinion that the main factors that were used by the organisation to promote fleet safety were instructions to drivers regarding safe driving, including driver education and training; vehicle inspections and conducting routine maintenance of vehicles; purchasing vehicles with high ANCAP safety ratings; and providing safety information to staff (Table 3.9).

### (v) The three main barriers for a driver in staying safe on the roadway

The main barriers for fleet drivers in staying safe on the roadway were reported to be: the behaviour of other drivers, their attitudes and their errors in driving, including not obeying road rules; the poor condition of some roadways; and the requirement for long distance driving (Table 3.9).

**Table 3.9: Fleet driver opinions of the three main factors that assist or are a barrier for fleet safety**

| Main factors used to promote fleet safety in the company | n | Main barriers in staying safe on the roadway | n |
|---|---|---|---|
| Driver instructions regarding safe driving, education and training | 6 | Other driver behaviours, attitudes and driver errors (e.g. not obeying road rules) | 13 |
| Vehicle inspections and routine maintenance | 6 | Poor roadways (e.g. single carriageway, windy, road works) | 9 |
| Safe vehicle with a high ANCAP safety rating | 4 | Long distance driving and the need for breaks | 4 |
| Safety information to staff (e.g. updating drivers regarding changes) | 4 | Ageing vehicle fleet and the need for a well maintained vehicle | 3 |
| Driver familiarisation and orientation to vehicle | 3 | Driver distractions | 3 |
| Driver skills and awareness | 3 | Driver motivation | 2 |
| Reporting of near misses and crashes and crash investigations | 3 | Lack of crash avoidance knowledge (e.g. safe speeds) | 1 |
| Use of new vehicle technology (e.g. vehicle safety features) | 2 | Wildlife | 1 |
| Resources (e.g. funds to stay in hotels on long trips instead of driving) | 2 | Lack of management commitment for fleet safety | 1 |
| Written safety policies and procedures (e.g. alcohol and drug policy) | 2 | Workload | 1 |
| Driver attitudes, behaviour and motivation | 2 | Lack of knowledge regarding company policies | 1 |
| Driving to the conditions (e.g. slow driving in fog) | 1 | Weather conditions | 1 |
| First aid knowledge | 1 | | |
| Imposing limits on driving time and encouragement of breaks | 1 | | |
| Safety pre-start checklist for vehicle use | 1 | | |

### (vi) Practices used to manage safety that reduce the risk of fleet vehicle crashes and related injuries

Nine drivers were of the opinion that practical driver awareness training, especially where drivers were taught to anticipate what was happening in traffic, was successful in reducing the risk of vehicle crashes and injuries. In addition, four drivers also thought that having induction training for vehicles and new technology contributed to a reduction in vehicle crashes.

Conducting regular maintenance and inspection of vehicles was stated by nine drivers as a useful practice to reduce the risk of vehicle crashes. Providing safe vehicles with high ANCAP safety ratings was thought by two drivers to reduce the risk of vehicle crashes and related injuries. Ensuring drivers obeyed the road rules was also reported by two drivers as important for driver safety. Decreasing the time spent in traffic by taking appropriate

breaks to manage fatigue, especially on long distances, was rated by two drivers as contributing to reduced vehicle crashes and related injuries. Two drivers also recommended the installation of GPS software in vehicles.

Other practices identified by drivers as useful for reducing vehicle crashes and injuries were: the requirement to keep driver logs as these were a useful indicator of fatigue; having a second person in the vehicle, especially for long distance trips; environmentally-friendly driving that conserved fuel and was also safer; responsible driving; encouraging drivers to report vehicle defects; adherence to the organisation's safe driving policy; and ensuring that all drivers had a valid driver's licence. Three drivers reported that they were unaware of any practices that might reduce the risk of vehicle crashes and subsequent injuries.

### (vii) The three essential practices to reduce the risk of fleet vehicle crashes

Fleet drivers considered, in their opinion, that the most essential practices to reduce the risk of fleet vehicle crashes were: the use of a safe vehicle, with a high ANCAP safety rating, that is well maintained; having undergone practical driver safety awareness training; and undergoing driver familiarisation and orientation to the fleet vehicle (Table 3.10).

**Table 3.10: Fleet driver opinions of the three essential practices to reduce the risk of fleet vehicle crashes**

| Essential practices to reduce the risk of fleet vehicle crashes | n |
|---|---|
| Use of a safe vehicle that is well maintained | 11 |
| Practical driver safety awareness training | 7 |
| Driver familiarisation and orientation to vehicle | 7 |
| Driver awareness | 4 |
| Fatigue management practices when driving long distances | 4 |
| Driver attitude | 3 |
| Good organisational policies and procedures | 3 |
| Management commitment to fleet safety | 2 |
| Drivers obeying the road rules | 2 |
| Speed management practices | 1 |
| Use of new vehicle technology | 1 |
| Getting drivers to teat the fleet vehicle as their own vehicle | 1 |
| Information regarding safe driving | 1 |
| Enviro-driving practices | 1 |
| Use of safety barriers on the roadways | 1 |
| Decreased workload (i.e. need time) | 1 |
| Drivers not affected by drugs | 1 |
| Use of licenced drivers | 1 |
| Investigation of vehicle crashes | 1 |
| Conducting driver assessments | 1 |
| Safety pre-start checks prior to vehicle use | 1 |

### (viii) Practices used to manage safety that have increased the risk of fleet vehicle crashes

The majority of drivers stated that they were unaware of any fleet safety management practices that had inadvertently increased the risk of vehicle crashes. However, three drivers reported that management not consulting with staff before implementing new fleet safety programs; using automatic 4WDs; and sales staff having to organise calls and manage customers while driving led to driver distractions and increased the risk of vehicle crashes.

### (ix) Areas where more could be done to manage fleet safety

Five drivers thought that more could be done to manage fleet safety by increasing an individual's knowledge and awareness of vehicles and their safety features, especially in relation to new technology. Five drivers also thought that conducting behavioural-based, defensive driver training would be of benefit to manage fleet safety. Having vehicles adequately maintained, especially pooled vehicles, was reported by three drivers, and purchasing only vehicles with high ANCAP safety ratings was stated by three drivers, as additional activities that could be conducted to manage fleet safety. Having tips for long distance driving, including how to manage your workload so it does not compromise safety in relation to fatigue was indicated by two drivers as useful additional practices to assist in managing fleet safety. Two drivers also recommended the installation of GPS software in vehicles.

Other initiatives that drivers thought could be used to manage fleet safety included: further improvements in vehicle engineering to improve the safety of vehicles; ongoing reviews of vehicle crash statistics; conducting random drug and alcohol testing; limiting the number of kilometres travelled per hour of driving in an attempt to reduce fatigue-related crashes; being aware that 4WDs are not the safest vehicles; and being aware that vehicle loading practices and type of equipment can reduce visibility on vehicle side mirrors.

### (x) Factors that may have an impact on fleet safety management

Table 3.11 describes the responses from drivers when asked, in their experience, whether a range of factors impacted on fleet safety management. Almost all drivers rated aspects of management systems and procedures as having an impact on fleet safety management, except for concern for the company's image, where around three-quarters (76.2%) of drivers felt this had an impact on fleet safety management, and contracting out of services, where less than half (47.6%) thought that this practice had an impact on fleet safety management.

Almost all drivers were of the opinion that both the monitoring and assessment strategies and the vehicle selection and maintenance strategies had an impact on the management of fleet safety in an organisation. Almost all drivers thought that employee recruitment, training and education strategies were effective in managing fleet safety, except for the distribution of fleet safety newsletters, where only 47.6% of drivers were of the opinion that this strategy was effective in contributing to the management of fleet safety, and fleet safety discussion or working groups where only two-thirds of drivers thought that this was an effective management strategy.

Just less than half (47.6%) the drivers thought that the use of rewards for good driving performance was a strategy that had an impact on fleet safety. Slightly more (57.1%) drivers were of the opinion that disincentives for poor driving performance were an effective fleet management strategy. Only 42.9% of drivers thought that reviewing the route travelled for possible safety issues would have an impact on fleet safety management. Almost all drivers thought that driver characteristics had an impact on fleet safety management, except for the employment of younger and older drivers, where the responses varied.

## 3.3 Conclusion

A convenience sample of 15 organisations took part in the interviews regarding fleet safety management practices. The organisations roughly divided into one-third each of small (<250 vehicles), mid-range (250-500 vehicles) and large (500+ vehicle) fleets. In total 15 fleet managers and 21 fleet drivers were interviewed.

Fleet managers described using a variety of strategies to manage fleet safety in their organisations. These strategies largely focused on developing and implementing policies and procedures related to fleet safety management, such as vehicle selection and purchasing procedures, fatigue management and mobile phone use policies. Fleet managers relied on timely information obtained from crash and/or near-miss reports to target initiatives. A few organisations also reported conducting vehicle audits, random inspections and identifying 'risky' drivers for focused interventions. Driver training was often reported as a practice used to manage fleet safety. However, the type of driver training and its frequency varied widely.

Fleet managers indicated that management and organisational commitment, crash investigation and reporting practices, use of safe vehicles, and safe driving polices all assisted in the management of fleet safety. Fleet drivers indicated that driver education and training, vehicle inspections and maintenance, safe vehicles and the provision of safety information to staff were the main factors used to promote fleet safety in the organisation.

Fleet managers and drivers reported that, in some cases, it was difficult to gauge how successful individual practices had been to manage fleet safety. However, fleet managers and drivers indicated that, in their opinion, the essential practices to manage the risk of fleet vehicle crashes were practical driver awareness training and education (including vehicle familiarisation), use of well maintained vehicles with high ANCAP ratings, an organisational awareness of fleet safety practices, along with crash reporting and investigation strategies, as long as the information obtained was acted upon.

Overall, fleet manager and driver interviews identified the following dimensions of fleet safety management as being the most important:

(a) management commitment, systems and procedures;

(b) monitoring and assessment;

(c) driver training and education; and

(d) vehicle technology, selection and maintenance.

**Table 3.11: Driver opinions of factors that may have an impact on fleet safety management** (n=21)

| | Yes % | No % | Not known % |
|---|---|---|---|
| **A. Management systems and procedures** | | | |
| Management leadership and commitment for fleet safety | 95.2 | - | 4.8 |
| Having in place company policies, guidelines or procedures that address fleet safety | 95.2 | - | 4.8 |
| Having cooperation between departments in an organisation regarding fleet safety responsibilities (e.g. HR and OHS) | 85.7 | - | 14.3 |
| Having a system in place to record information regarding any vehicle crashes or worker injuries | 100 | - | - |
| Adopting a risk management or preventive approach to vehicle crashes | 95.2 | 4.8 | - |
| The safety culture of an organisation | 100 | - | - |
| Concern for the company's image | 76.2 | 9.5 | 14.3 |
| Having consultation between management and workers regarding safety issues (i.e. involving workers in decision making) | 95.2 | - | 4.8 |
| Contracting out of services | 47.6 | 23.8 | 28.6 |
| **B. Monitoring and assessment** | | | |
| Conducting audits or evaluating fleet safety practices (e.g. participation in an accreditation scheme or self-auditing) | 95.2 | 4.8 | - |
| Conducting driver performance monitoring and feedback (e.g. in-vehicle monitoring) | 85.7 | 9.5 | 4.8 |
| Analysing and reviewing past vehicle crash trends | 100 | - | - |
| **C. Vehicle selection and maintenance** | | | |
| Having vehicle selection guidelines in place (e.g. ABS brakes) | 100 | - | - |
| Conducting routine vehicle maintenance | 100 | - | - |
| Conducting pre-trip vehicle inspections | 90.5 | - | 9.5 |
| **D. Employee recruitment, training and education** | | | |
| Using employee selection procedures (e.g. licence checks, eye sight checks, driver history) | 85.7 | 9.5 | 4.8 |
| Conducting employee induction training | 95.2 | 4.8 | - |
| Conducting employee education and training (e.g. defensive driver training, manoeuvring) | 85.7 | 9.5 | 4.8 |
| Driver safety awareness programs | 95.2 | 4.8 | - |
| Producing and distributing a fleet safety newsletter | 47.6 | 28.6 | 23.8 |
| Having fleet safety working groups or discussion groups | 66.7 | 19.0 | 14.3 |
| **E. Performance-based incentives and disincentives** | | | |
| Rewarding drivers for good or improved vehicle safety performance (e.g. recognition, bonus) | 47.6 | 23.8 | 28.6 |
| Having disincentives for drivers for poor or worse vehicle safety performance | 57.1 | 23.8 | 19.0 |
| **F. Vehicle journeys** | | | |
| Reviewing the route travelled by drivers for possible safety issues | 42.9 | 33.3 | 23.8 |

| | Yes % | No % | Not known % |
|---|---|---|---|
| Using risk management strategies to reduce the risk of vehicle crashes (e.g. for speed, fatigue) | 95.2 | - | 4.8 |
| **G. Driver characteristics** | | | |
| Employing older drivers | 47.6 | 47.6 | 4.8 |
| Employing younger drivers | 52.4 | 42.9 | 4.8 |
| A driver's attitude to safe driving/ road safety | 90.5 | 9.5 | - |
| A driver's road traffic violation history (e.g. speeding tickets) | 81.0 | 9.5 | 9.5 |
| Work pressure on drivers | 90.5 | 9.5 | - |

# 4. Fleet safety management audit tool

The information obtained from the fleet safety and OHS literature supplemented by data obtained from the fleet manager and driver interviews was used to inform the development of a draft fleet safety management audit tool. Triangulating information from these three sources assisted in the identification of the necessary and sufficient audit dimensions, or categories, and the creation of objective, 'best practice' criteria against which to assess fleet safety management performance.

Five main categories of operations management were included in the draft tool. Each of these categories had between 1 and 3 sub-categories as shown in Table 4.1.

**Table 4.1: Categories and sub-categories included in the draft tool**

| Main categories | Subcategories |
|---|---|
| 1 Management, systems and processes | 1.1 Management commitment<br>1.2 Fleet safety management<br>1.3 Communication regarding fleet safety |
| 2 Monitoring and assessment | 2.1 Monitoring fleet safety performance<br>2.2 Vehicle crash and incident investigation<br>2.3 Performance monitoring and recognition |
| 3 Employee recruitment, training and education | 3.1 Driver selection and assessment<br>3.2 Employee fleet safety induction<br>3.3 Driver training |
| 4 Vehicle technology, selection and maintenance | 4.1 Fleet vehicle selection<br>4.2 Fleet vehicle maintenance |
| 5 Vehicle journeys | 5.1 Journey management |

The tool provided a general description of management operations (Strategic Criteria) together with examples of specific, verifiable practices (Operational Criteria) corresponding to four different levels of performance on each subcategory. Organisations used the descriptive information to rate their performance on each sub-category at one of the four levels. Level I performance indicated current best practice ranging to Level IV performance indicated poor performance relative to best practice. Scoring the four levels from 0 (Level IV) to 3 (Level I) and summing the 12 subcategory scores yielded a total score out of 36 which provided a guide to the organisation's overall performance relative to best practice across all the categories. More sophisticated methods of scoring involving the weighting of subcategory scores according to their relative importance were not adopted at this stage in the audit tool development because there is very little evidence upon which to base such weightings.

## 4.1 Useability pilot

Five volunteer A*f*MA member organisations were recruited to assess the usability of the draft audit tool. This usability pilot testing was undertaken by the fleet managers in these organisations. The fleet managers were provided with a copy of the draft audit tool, a scoring sheet and a brief usability questionnaire (see Appendix 6). They were asked to apply the audit tool to their own organisation and to note any issues or problems that arose as they did so. On completion, they were asked to complete the usability questions and return these to the investigators. The usability questionnaire asked the managers for their assessment of the language used in the draft audit tool, its coverage, its ease of use, and its potential usefulness.

### (i) Participants

The usability pilot companies were quite homogeneous in that four of the five were large, commercial organisations. The fifth pilot participant was a government agency.

### (ii) Ease of use

All but one of the pilot participants found the audit tool easy to use in its current form. One participant felt some revisions would improve the ease of use (Table 4.2). These revisions related to the inclusion of the need for safety and emergency equipment to be provided in a vehicle in case of vehicle breakdown.

**Table 4.2: Rating of ease of use of the fleet safety management audit tool**

| Rated ease of use | Number |
|---|---|
| Easy to use | 4 |
| Okay to use, if revised | 1 |
| Total | 5 |

### (iii) Clarity of language

In general, participants judged the language clear and easy to understand for all the audit tool categories, but one participant felt the wording of the first category (management, systems and processes) could be made clearer (Table 4.3). This participant felt that they had difficulty in assessing some of the criteria in this category as their organisation met criteria in different levels, but that where this occurred they selected the lower level. The participant initially thought the rating scale could be expanded, but then felt that expansion might make the audit tool too complex. On reflection, the participant felt that there was enough information in the criteria to identify an appropriate level in the current format of the audit tool.

**Table 4.3: Rating of clarity of language used in the fleet safety management audit tool**

| Language Clear? | Management, systems and processes | Monitoring and assessment | Employee recruitment, training and education | Vehicle technology, selection and maintenance | Vehicle journeys |
|---|---|---|---|---|---|
| No | 1 | 0 | 0 | 0 | 0 |
| Yes | 4 | 5 | 5 | 5 | 5 |
| Total | 5 | 5 | 5 | 5 | 5 |

### (iv) Clarity of audit criteria

Most participants reported no problems interpreting the audit category criteria, but one participant felt the criteria for the first category (management, systems and processes) could be made clearer (Table 4.4). As described above, the participant initially thought the rating scale could be expanded, but then felt that expansion might make the audit tool too complex. On reflection, the participant felt that there was enough information in the criteria to identify an appropriate level in the current format of the audit tool.

**Table 4.4: Rating of clarity of audit criteria used in the fleet safety management audit tool**

| Problem interpreting criteria? | Management, systems and processes | Monitoring and assessment | Employee recruitment, training and education | Vehicle technology, selection and maintenance | Vehicle journeys |
|---|---|---|---|---|---|
| No | 4 | 5 | 5 | 5 | 5 |
| Yes | 1 | 0 | 0 | 0 | 0 |
| Total | 5 | 5 | 5 | 5 | 5 |

### (v) Usability of audit criteria

Most participants reported that there was enough information in the audit criteria to identify the appropriate rating for their organisation. However, at least one participant for each of the audit categories would have preferred more information in the criteria (Table 4.5). Two participants indicated that they spent a bit of time reading the criteria for each level a couple of times in order to determine what was different between them.

**Table 4.5: Rating of useability of audit criteria in the fleet safety management audit tool**

| Enough information in criteria? | Management, systems and processes | Monitoring and assessment | Employee recruitment, training and education | Vehicle technology, selection and maintenance | Vehicle journeys |
|---|---|---|---|---|---|
| No | 3 | 1 | 1 | 1 | 1 |
| Yes | 2 | 4 | 4 | 3 | 3 |
| Total | 5 | 5 | 5 | 4 | 4 |

### (vi) Usefulness of criteria in identifying strengths and weaknesses

All participants felt that the audit criteria assisted in identifying strengths and weaknesses in fleet safety management (Table 4.6).

**Table 4.6: Rating of usefulness of audit criteria in identifying strengths and weaknesses in fleet safety management**

| Criteria showed strengths & weaknesses? | Management, systems and processes | Monitoring and assessment | Employee recruitment, training and education | Vehicle technology, selection and maintenance | Vehicle journeys |
|---|---|---|---|---|---|
| No | 0 | 0 | 0 | 0 | 0 |
| Yes | 5 | 5 | 5 | 5 | 5 |
| Total | 5 | 5 | 5 | 5 | 5 |

### (vii) Usefulness of criteria for future planning

All participants felt that the audit criteria for each category could be used as a guide for planning fleet safety management improvements (Table 4.7). One participant stated that:

> "I found the audit tool very effective and it has identified areas for improvement and areas that could be revisited".

**Table 4.7: Rating of usefulness of audit criteria as a guide for planning improvements in fleet safety management**

| Criteria useful as a guide for planning | Management, systems and processes | Monitoring and assessment | Employee recruitment, training and education | Vehicle technology, selection and maintenance | Vehicle journeys |
|---|---|---|---|---|---|
| No | 0 | 0 | 0 | 0 | 0 |
| Yes | 5 | 5 | 5 | 5 | 5 |
| Total | 5 | 5 | 5 | 5 | 5 |

### (viii) Adequacy of coverage of audit tool

When asked whether there were additional topics that should be included in the audit tool, three participants suggested additional topics. One suggested the provision of emergency equipment and personal protective equipment (PPE), such as torches, reflective vests, and breakdown signage, in work vehicles. Other participants thought the issues of mobile phone use management and accident and incident data analysis should be given greater prominence as issues in their own right.

None of the participants nominated topics that should be removed from the audit tool, suggesting the included topics were appropriate.

### (ix) Usefulness of audit tool

All five pilot participants felt that the audit was useful for identifying areas where fleet safety management could be improved. One participant stated that:

> "The aims and objectives behind this tool have merit and I believe will benefit those organisations who are looking to improve their performance in fleet safety management but are unsure of the key areas to focus on. It will also allow organisations with fleet safety management systems in place to assess the effectiveness of those systems".

### (x) Benchmarking

All five pilot participants were interested in using an audit tool for benchmarking and four thought the current tool would be useful or very useful for this purpose (Table 4.8). However, one participant noted:

> "A self-audit tool can be difficult and benchmarking results may vary dependent upon an individual's interpretation and time spent on the document."

**Table 4.8: Rating of usefulness of fleet safety management audit tool for benchmarking**

| Audit tool useful for benchmarking | Number |
|---|---|
| Somewhat useful | 1 |
| Useful | 2 |
| Very useful | 2 |
| Total | 5 |

### (xi) Suggested frequency of use of audit tool

Most of the pilot participants recommended that the audit tool be used at least annually (Table 4.9). One participant felt that the period for review may vary from organisation to organisation dependent upon the results obtained from using the audit tool.

**Table 4.9: Frequency of use of the fleet safety management audit tool for benchmarking**

| Frequency of use of audit tool | Number |
|---|---|
| 6-12 monthly | 1 |
| Annually | 3 |
| Every 2 years | 1 |
| Total | 5 |

**(xii) Correspondence between initial perception and audit tool score**

Four of the five pilot participants provided a rating of their organisation's fleet safety management level before using the audit tool. The ratings were made on a five point scale of: 'poor', 'well below best practice', 'below best practice', 'approaching best practice' and 'achieving best practice'. These were compared to the overall score attained on the audit tool, where scores of 0-7 were 'poor', 8-14 were 'well below best practice', 15-21 were 'below best practice', 22-28 were 'approaching best practice' and 29-36 were 'achieving best practice For each participant, the audit tool rating was the same as the participant's initial rating. The ratings and audit scores attained by the pilot organisations were distributed between two levels, i.e. 'below best practice' and 'approaching best practice'.

## 4.2 Finalisation of the fleet safety management audit tool

Following the useability pilot, several changes were made to the fleet safety management audit tool based on the comments received from the pilot organisations. These included:

- the provision for safety and emergency equipment in vehicles in case of vehicle breakdown was included in the 'fleet safety management' criteria;
- where possible, a lettering system was added to help users differentiate the criteria defining the different levels of management performance; and
- additional instructions were included in the description of scoring of the results of the fleet safety audit tool to account for organisations who may outsource fleet safety functions specified in the audit tool.

The following sections present the introduction to the audit tool for users (section 4.3) and the revised audit tool and scoring sheet (section 4.4).

## 4.3 Using the fleet safety management audit tool

The audit tool was primarily developed for light fleet vehicles i.e. vehicles, such as cars and vans less than 4.5 tonnes. The audit tool was developed using evidence regarding fleet safety best practices from a review of the research literature and following interviews with fleet managers and drivers regarding fleet safety practices and a useability assessment.

### *4.3.1 Aim of the fleet safety audit tool*

The aim of the fleet safety management audit tool is to provide standardised criteria to enable organisations to benchmark their fleet safety performance against best practice. The audit tool can be used to conduct audits within a company to provide an indicator of progress in managing fleet safety and it can be used to benchmark performance with other companies. The fleet safety audit tool is designed to identify the extent to which fleet safety is managed in an organisation using best practice techniques.

### *4.3.2 Structure of the fleet safety audit tool*

The audit tool covers five aspects of operations management. These include:

- management, systems and processes;
- monitoring and assessment;
- employee recruitment, training and education;
- vehicle technology, selection and maintenance; and
- vehicle journeys.

Each of the five categories consists of between 1 and 3 sub-categories. The categories focus on management practices that can be verified, rather than less easily measured qualities. An organisation rates its performance on each sub-category at one of 4 levels. These ratings range from level I to level IV as follows:

- Level I indicates the organisation is performing at a high standard for this criteria;
- Level II indicates the organisation is performing well for this criteria, but there is some room for improvement;
- Level III indicates the organisation is performing OK on this criteria but there is considerable room for improvement; and
- Level IV indicates the organisation is performing poorly on this criteria, with little to no activity.

For each level, a general description of the criteria is provided ('Strategic Criteria'), together with concrete examples of how they could be reflected in an organisation ('Operational Criteria').

### *4.3.3 Scoring of the fleet safety audit tool*

The Level that an organisation achieves on each sub-category is scored. A rating of Level IV receives a score of 0, Level III receives a score of 1, Level II receives a score of 2 and Level 1 receives a score of 3. These scores can then be added over all the subcategories to yield a total score out of 36.

| 0-7 | 8-14 | 15-21 | 22-28 | 29-36 |
|---|---|---|---|---|
| Poor | Well below best practice | Below best practice | Approaching best practice | Achieving best practice |

### *4.3.4 Using the fleet safety audit tool*

The audit tool requires honest and critical self-evaluation from organisations. It is intended that information to conduct a fleet safety audit using the tool will be obtained from a range of sources, which could include direct observations, interviews with managers and staff, and an examination of policies and other relevant documents.

The audit tool can be applied to the whole organisation. However, when an organisation has divisions or sections that are at different stages with their fleet safety management system, it may be more informative to apply the audit tool to individual sections separately. Alternatively, if the audit tool is applied to the whole organisation, the lowest level of performance achieved by a division or section should be used as the organisation's score.

If an organisation outsources any of the activities associated with fleet safety management, such as vehicle selection and/or maintenance, the organisation should rate the level of safety management performance that is formally expected of, and met, by that service provider under the service contract conditions.

### *4.3.5 Using the fleet safety audit tool for benchmarking*

The fleet safety audit tool can be used to identify areas for improvement in managing fleet safety in an organisation and can then be used to measure progress in improving the management of fleet safety in the organisation. For example, a low score for a particular sub-category provides an indication of a need for improvement in that area.

The audit tool can also be used by an organisation to benchmark their management of fleet safety again against other organisations. Benchmarking involves identifying key processes or criteria that contribute towards best practice in an organisation, assessing how the organisation rates on these criteria, and then comparing how other organisations are faring on these same key criteria. Essentially, it involves learning how other organisations are performing and learning from what they do to improve performance.

## 4.4 Fleet safety management audit tool

### 1. Management, systems and processes

Management demonstrates leadership and commitment to fleet safety management. Fleet safety is managed using a pro-active, risk management approach. There is consultation between management and workers regarding fleet safety issues, with workers involved in the decision making process.

### 1.1 Management commitment

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. Management commitment is formally required and assessed for fleet safety management and/or performance. This occurs across management levels.<br><br>B. Management accountabilities are linked to fleet safety management and/or performance objectives.<br><br>C. There is recognition by management of the need to allocate resources specifically to fleet safety management and to commit adequate resources. | A. All levels of management (executive, senior and middle management, and front line supervisors) have documented responsibilities and performance criteria specifically for fleet safety management.<br><br>B. There is a system in place to assess fleet safety management and/or performance against performance agreements or statements of responsibility.<br><br>C. Dedicated and sufficient resources are allocated to manage fleet safety. |
| II | A. Management commitment is formally required and assessed for some management levels for fleet safety management and/or performance.<br><br>B. Some management accountabilities are linked to fleet safety management and/or performance objectives.<br><br>C. There is recognition by management of the need to allocate resources specifically to fleet safety management. | A. Some, but not all levels of management (executive, senior and middle management, and front line supervisors), have documented responsibilities and performance criteria specifically for fleet safety management.<br><br>B. There is a system in place to assess fleet safety management and/or performance against performance agreements or statements of responsibility.<br><br>C. Some resources are allocated specifically to manage fleet safety but not all requests are funded. |
| III | A. Management commitment is limited to front line supervisors or middle management and is not assessed for fleet safety management and/or performance.<br><br>B. No front line supervisor or middle management accountabilities are linked to fleet safety management and/or performance | A. Front line supervisors or middle management are responsible for fleet safety management.<br><br>B. There is no system in place to assess fleet safety management and/or performance against performance agreements or statements of responsibility. |

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| | objectives.<br><br>C. There is recognition by management of the need to allocate resources to fleet safety management. | <br><br>C. Resources allocated to manage fleet safety are embedded within other program budgets so that there is competition for these funds. |
| IV | A. Management commitment is not demonstrated for fleet safety management and/or performance.<br><br>B. No management accountabilities are linked to fleet safety management and/or performance objectives.<br><br>C. Management allocate no, or limited, resources to fleet safety management. | A. There are no documented management responsibilities regarding fleet safety management and/ or performance.<br><br>B. There is no system in place to assess fleet safety management and/or performance against performance agreements or statements of responsibility.<br><br>C. No, or minimal, resources are allocated to manage fleet safety in the organisation. If resources are allocated, these tend to be embedded within other program budgets. |

## 1.2 Fleet safety management

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. A fleet safety policy exists and its implementation is actively monitored by management.<br><br>B. There is a proactive, risk management-based system in place to manage fleet safety in the organisation. That is, hazard identification and risk assessments are done routinely and prevention strategies are implemented accordingly.<br><br>Fleet safety management is embedded within a broader system of OHS management.<br><br>The organisation strives for continuous improvement in fleet safety management. | A. The organisation has a fleet safety policy and a system for monitoring its application.<br><br>B. Fleet safety is managed using a risk management approach[1] that is integrated into holistic system with OHS management.<br><br>There is a mechanism for ongoing review of existing risk management approaches to managing fleet safety to improve performance.<br><br>The risk management approach outlines the responsibilities of all parties in relation to fleet safety, including management, supervisors and workers. All parties are aware of their responsibilities.<br><br>The system meets current legislative requirements.[2] |
| II | A. A fleet safety policy exists and its implementation is actively monitored by management.<br><br>B. There is a proactive, risk management-based system in place to manage fleet safety in the organisation. That is, hazard identification and risk assessments are done routinely and prevention strategies are implemented accordingly. | A. The organisation has a fleet safety policy and a system for monitoring its application.<br><br>B. Fleet safety is managed using a risk management approach.<br><br>The risk management approach outlines the responsibilities of all parties in relation to fleet safety, including management, supervisors and workers. All parties are aware of their responsibilities.<br><br>The system meets current legislative requirements. |
| III | B. There is a proactive, risk management approach to the management of fleet safety in the organisation. However, fleet safety is largely managed through specific policies aimed at managing different aspects of fleet safety. | B. Fleet safety is managed proactively using a number of separate policies aimed at managing aspects of fleet safety, such as a fleet safety policy, a fatigue management policy, a mobile phone use while driving policy, a policy outlining safety and emergency equipment that should be available in a vehicle (e.g. reflective vest, fire extinguisher, torch, signage to indicate a vehicle breakdown)<br><br>The policies outline the responsibilities of all |

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| | | parties including management, supervisors and workers, in relation to aspects of fleet safety. All parties are aware of their responsibilities.<br><br>The policies meet current legislative requirements. |
| IV | C. There is a reactive approach to the management of fleet safety in the organisation. | C. Fleet safety is largely managed using a reactive approach. For example, the organisation implements prevention initiatives only after crashes. There is limited to no proactive forward planning to manage fleet safety. |

[1] A risk management approach includes, the: (i) identification and assessment of hazards; (ii) identification and implementation of solutions (i.e. the hierarchy of controls provides a framework for the identification of effective solutions); (iii) monitoring the implementation of solutions; and (iv) continuous review.

[2] Examples of relevant information sources regarding legislative requirements and guidance for fleet managers operating in NSW are contained in Appendix 7.

## 1.3 Communication regarding fleet safety

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. There is a mechanism for formal consultation between management and staff regarding fleet safety on a regular basis.<br><br>B. Information on fleet safety performance is distributed and opinions sought on performance improvement strategies. | A. The organisation has a formal mechanism for regular two-way consultation and communication between management and staff regarding fleet safety. For example, a dedicated fleet safety management committee that consists of a mix of staff and management representatives.<br><br>B. A formal consultation process is used to discuss fleet safety management strategies. For example, a fleet safety management committee reviews risk assessment results, fleet safety performance, including the results of crash investigations, and provides advice regarding preventive measures, including, hazard elimination strategies, training needs, or communication and awareness raising strategies. |
| II | A. There is a mechanism for consultation between management and staff regarding fleet safety on a regular basis. | A. The organisation has a mechanism for staff consultation regarding fleet safety on a regular basis. For example, staff are given an opportunity to participate and/or provide information regarding fleet safety through a mechanism, such as group meetings or toolbox talks.<br><br>Staff can formally raise fleet safety issues and assist to identify appropriate solutions during group meetings or toolbox talks. |
| III | B. Information is provided to staff regarding vehicle and/or road safety practices on a regular basis. | B. The organisation has a mechanism to distribute fleet or road safety information to staff on a regular basis. For example, the organisation distributes emails or a fleet safety newsletter or circular, or has an on-line forum to convey messages to staff regarding vehicle and/or road safety issues.<br><br>Staff can raise fleet safety issues informally through, for example, discussions with their supervisor. |
| IV | C. Little to no information is provided to staff on vehicle and/or road safety on a regular basis. | C. The organisation does not have any formal communication mechanisms to provide information to staff regarding fleet and/or road safety on a regular basis.<br><br>There is no systematic process for staff consultation or feedback on fleet safety issues. |

## 2. Monitoring and assessment

The organisation conducts crash investigations for at-fault vehicle crashes involving workers. The organisation has systems in place to monitor fleet safety performance and is able to review at-fault vehicle crash trends. The organisation has mechanisms in place to recognise good driving performance and to respond to driver infractions.

### 2.1 Vehicle crash and incident investigation

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. Fleet vehicle crashes and incidents are routinely investigated by the organisation. The investigative process systematically identifies and documents the circumstances and the causal factors (immediate and root causes) of vehicle crashes and incidents.<br><br>B. The information obtained from crash and incident investigations is used to develop prevention initiatives to improve fleet safety.<br><br>C. Identified vehicle crash and incident prevention measures are implemented in the organisation and a mechanism is in place to follow-up on the status of implementation. | A. Established processes are in place for the investigation and documentation of fleet vehicle crashes and incidents in the organisation. These processes may include driver interviews, vehicle inspections, crash scene inspections, and review of police reports.<br><br>The investigative process seeks to identify the circumstances surrounding the vehicle crash, particularly the causal factors of the vehicle crash. The investigative process includes:<br><br>(i) establishing the circumstances of the crash (such as who was involved; the location of the crash);<br><br>(ii) characteristics of the driver (e.g. age, gender, number of previous crashes);<br><br>(iii) characteristics of the vehicle (e.g. any defects; damage sustained);<br><br>(iv) weather and road conditions (e.g. wet/dry; sealed/dirt road, dual/single carriageway); and<br><br>(v) immediate and root causal factors of the crash (e.g. speed due to time pressure, fatigue due to excessive work, shift work etc, loss of control in the wet due to lack of safety features on the car).<br><br>B. The information obtained from the investigative process is used to identify appropriate crash and incident preventive strategies.<br><br>C. Identified prevention strategies are implemented in the organisation within a suitable timeframe. There are mechanisms in place to follow-up on the implementation of recommended prevention measures. |
| II | A. Fleet vehicle crashes are routinely investigated by the organisation. The investigative process systematically identifies | A. Established processes are in place for the investigation and documentation of vehicle crashes in the organisation. These processes |

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| | and documents the circumstances and the causal factors (immediate and root causes) of vehicle crashes.<br><br>B. The information obtained from crash investigations is used to develop prevention initiatives to improve fleet safety. | may include driver interviews, vehicle inspections, crash scene inspections, review of police reports.<br><br>The investigative process seeks to identify the circumstances surrounding the vehicle crash, particularly the causal factors of the vehicle crash. The investigative process includes:<br>(i) establishing the circumstances of the crash (such as who was involved; the location of the crash);<br>(ii) characteristics of the driver (e.g. age, gender, number of previous crashes);<br>(iii) characteristics of the vehicle (e.g. any defects; damage sustained);<br>(iv) weather and road conditions (e.g. wet/dry; sealed/dirt road, dual/single carriageway); and<br>(v) immediate and root causal factors of the crash (e.g. speed due to time pressure, fatigue due to excessive work, shift work, etc, loss of control in the wet due to lack of safety features on the car).<br><br>B. The information obtained from the investigative process is used to identify appropriate crash preventive strategies. |
| III | C. Fleet vehicle crashes are investigated in an ad hoc way and minimal information about the root causes of crashes is collected or analysed. | C. Established processes are in place for the investigation and documentation of vehicle crashes in the organisation. These processes may include driver interviews, vehicle inspections, crash scene inspections, review of police reports.<br><br>The investigative process seeks to identify the circumstances surrounding the vehicle crash, and may examine causal factors but not in a systematic way. |
| IV | D. There is no investigation of vehicle crashes. | D. No formal crash investigation process or procedures exist in the organisation. |

## 2.2 Monitoring fleet safety performance

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. There is a mechanism in place for monitoring fleet safety performance on a regular basis.<br><br>B. Performance is measured using both outcome and proactive performance measures.<br><br>C. Fleet safety performance monitoring is linked to continuous improvement strategies for fleet safety management.<br><br>D. The organisations' fleet safety performance is benchmarked with other organisations. | A. Fleet safety performance is assessed through monitoring outcomes, such as the number and rate of all fleet vehicle crashes, at-fault fleet vehicle crashes and near-misses, including any fatalities or injuries, fleet vehicle repair costs, fleet vehicle insurance premium costs, and traffic infringements on at least a quarterly basis.<br><br>Performance monitoring mechanisms meet current legislative requirements for the reporting of workplace incidents.<br><br>B. Monitoring is also undertaken of proactive fleet safety performance measures, such as audit results, fleet vehicle inspection results, training outcomes.<br><br>C. There is a mechanism for ongoing review of existing fleet management approaches based on fleet safety performance results.<br><br>D. The organisation benchmarks fleet safety performance with other organisations. |
| II | A. There is a mechanism in place for monitoring fleet safety performance on a regular basis.<br><br>B. Performance is measured using both outcome and proactive performance measures.<br><br>C. Fleet safety performance monitoring is linked to continuous improvement strategies for fleet safety management. | A. Fleet safety performance is assessed through monitoring outcomes, such as the number and rate of all fleet vehicle crashes, at-fault fleet vehicle crashes and near-misses, including any fatalities or injuries, fleet vehicle repair costs, fleet vehicle insurance premium costs, and traffic infringements on at least a quarterly basis.<br><br>Performance monitoring mechanisms meet current legislative requirements for the reporting of workplace incidents.<br><br>B. Monitoring is also undertaken of proactive fleet safety performance measures, such as audit results, fleet vehicle inspection results, training outcomes.<br><br>C. There is a mechanism for ongoing review of existing fleet management approaches based on fleet safety performance results. |

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| III | A. There is a mechanism in place for monitoring fleet safety performance on a regular basis.<br><br>B. Performance is measured using outcome performance measures. | A. Fleet safety performance is assessed through monitoring outcomes, such as the number and rate of all fleet vehicle crashes, at-fault fleet vehicle crashes and near-misses, including any fatalities or injuries, fleet vehicle repair costs, fleet vehicle insurance premium costs, and traffic infringements on at least a quarterly basis.<br><br>Performance monitoring mechanisms meet current legislative requirements for the reporting of workplace incidents. |
| IV | A. There is a mechanism in place for recording information regarding fleet safety performance. | A. A system exists for recording information on fleet safety performance that includes: workers injuries, fleet vehicle crashes, and fleet vehicle repair costs.<br><br>Performance monitoring mechanisms meet current legislative requirements for the reporting of workplace incidents. |

## 2.3 Performance monitoring and recognition

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. Good or poor driving performance is identified and recognised in the organisation.<br><br>B. The organisation uses in-vehicle monitoring technology as part of a formal driving performance monitoring system.<br><br>C. Feedback regarding driving performance is part of a formal performance monitoring system that includes consequences for poor performance. | A. The organisation has a mechanism in place to identify and recognise good or poor driving performance in the organisation. This recognition is in the form of incentives for good driving performance or disincentives for poor driving performance.<br><br>B. Driving performance is assessed by monitoring performance measures such as: at-fault vehicle crashes, traffic infringements, vehicle panel repair costs, fuel consumption checks, in-vehicle monitoring (e.g. speed, heavy braking).<br><br>C. Feedback is provided regarding driving performance as part of a formal employee performance monitoring system with consequences for poor performance, such as mandatory driving training, suspension from using fleet vehicles. |
| II | A. Good or poor driving performance is identified and recognised in the organisation.<br><br>B. The organisation uses in-vehicle monitoring technology and encourages drivers to self-monitor their driving performance.<br><br>C. Feedback regarding driving performance is provided, but feedback is not part of a formal performance monitoring system. | A. The organisation has a mechanism in place to identify and recognise good or poor driving performance in the organisation.<br><br>B. Driving performance is assessed by monitoring performance measures such as: at-fault vehicle crashes, traffic infringements, vehicle panel repair costs, fuel consumption checks, in-vehicle monitoring (e.g. speed, heavy braking).<br><br>Self monitoring is conducted using in-vehicle monitoring devices regarding driving performance. For example, auditory warnings of safe driving breeches such as vehicle speed.<br><br>C. Feedback is provided regarding driving performance to the driver, but there are no consequences for poor performance. |
| III | A. Good or poor driving performance is identified in the organisation.<br><br>B. The organisation does not use in-vehicle monitoring technology. | A. The organisation has a mechanism in place to identify good or poor driving performance. However, organisation does not provide any performance recognition for good or poor driving performance.<br><br>B. Driving performance is assessed by |

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| | C. No feedback regarding driving performance is provided to drivers. | monitoring performance measures such as: at-fault vehicle crashes, traffic infringements, vehicle panel repair costs, fuel consumption checks. |
| IV | A. Good or poor driving performance is not identified in the organisation. | A. The organisation does not have a mechanism in place to identify good or poor driving performance. |

## 3. Employee recruitment, training and education

The organisation has systems in place to select safe drivers. The organisation conducts fleet safety and vehicle-specific induction programs for employees. The organisation identifies, conducts and evaluates driver training programs for employees, as required.

### 3.1 Driver selection and assessment

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. The organisation conducts pre-hire checks on safe driving history and licence currency before hiring drivers, or conducts checks before permitting fleet vehicle use for the first time.<br><br>B. The organisation checks driver competency before permitting fleet vehicle use for the first time.<br><br>C. The organisation assesses drivers' on-road risk on a continuous basis.<br><br>D. The organisation regularly checks driver infringements and licence currency. | A. The organisation has procedures in place to conduct pre-hire driving history checks for people hired as drivers. This might include licence checks or obtaining information on past driving history, including driving infringements, such as speeding fines. It might also include referee checks. Or, the organisation applies these procedures before allowing new staff to drive fleet vehicles.<br><br>B. The organisation has a formal system in place to check the driving of new fleet drivers (e.g. a test drive or ride-along assessment).<br><br>C. The organisation has mechanism in place to identify risky drivers. This might include obtaining information on driver performance including: at-fault vehicle crashes, traffic infringements, vehicle panel repair costs, fuel consumption checks, in-vehicle monitoring.<br><br>D. The organisation conducts continuous monitoring of driver performance using all or some of the performance measures described above. |
| II | A. The organisation conducts pre-hire checks on safe driving history before hiring drivers, or conducts checks before permitting fleet vehicle use for the first time.<br><br>C. The organisation regularly checks driver infringements and licence currency. | A. The organisation has procedures in place to conduct pre-hire driving history checks of drivers. This might include obtaining information on past driving history, including driving infringements, such as speeding fines. It might also include referee checks. Or, the organisation applies these procedures before allowing new staff to drive fleet vehicles.<br><br>C. The organisation has mechanism in place to identify risky drivers. This might include obtaining information on driver performance including: at-fault vehicle crashes, traffic infringements, vehicle panel repair costs, fuel consumption checks, in-vehicle monitoring. |

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| | | |
| III | A. The organisation conducts pre-hire checks on safe driving history and licence currency before hiring drivers, or conducts checks before permitting fleet vehicle use for the first time. | A. The organisation has procedures in place to conduct pre-hire driving history checks of drivers. This might include licence checks or obtaining information on past driving history, including driving infringements, such as speeding fines. It might also include referee checks. Or, the organisation applies these procedures before allowing new staff to drive fleet vehicles. |
| IV | A. The organisation does not conduct pre-hire checks on safe driving history before hiring workers nor does it identify risky drivers. | A. No pre-hire driving history checks are conducted by the organisation and risky drivers are not identified. |

## 3.2 Employee fleet safety induction

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. The organisation conducts a fleet safety induction program for workers.<br><br>B. The organisation conducts vehicle-specific orientation training for workers.<br><br>C. Workers receive training on new vehicle technologies, as appropriate. | A. The organisation has in place a fleet safety induction program for employees. The induction program includes:<br>(i) policies and procedures around safe vehicle use;<br>(ii) policies and procedures around vehicle maintenance and pre-trip vehicle checks; and<br>(iii) reporting requirements for vehicle defects, crashes and near misses.<br><br>B. The organisation has in place vehicle-specific orientation training. Vehicle-specific orientation training includes:<br>(i) orientation to vehicle;<br>(ii) orientation to safety features of vehicle; and<br>(iii) vehicle maintenance and checking protocols.<br><br>C. The fleet safety induction program includes specific training for any new vehicle technologies that are fitted in fleet vehicles, such as ABS brakes, stability control, in-vehicle monitoring devices, GPS. |
| II | A. The organisation conducts a fleet safety induction program for workers.<br>OR<br>C. The organisation conducts vehicle-specific orientation training for workers. | A. The organisation has in place a fleet safety induction program for employees. The induction program includes:<br>(i) policies and procedures around safe vehicle use;<br>(ii) policies and procedures around vehicle maintenance and pre-trip vehicle checks; and<br>(iii) reporting requirements for vehicle defects, crashes and near misses.<br>OR<br>C. The organisation has in place vehicle-specific orientation training. Vehicle-specific orientation training includes:<br>(i) orientation to vehicle;<br>(ii) orientation to safety features of vehicle; and<br>(iii) vehicle maintenance and checking protocols. |
| III | D. The organisation conducts a general OHS induction for workers. The OHS induction training includes information on fleet safety. | D. The organisation has in place a general OHS induction program for employees. The OHS induction program includes a component on |

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| | | fleet safety that encompasses:<br>(i) general OHS hazard identification and risk assessment practices; and<br>(ii) reporting requirements for vehicle defects and crashes. |
| IV | E. The organisation does not have an induction program for workers with information on fleet safety. | E. No induction processes are conducted for workers around fleet safety by the organisation. |

## 3.3 Driver training

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. The organisation conducts training needs analysis for drivers based on a detailed understanding of the particular driving tasks that are required.<br><br>B. The organisation provides driving training to workers, as required, based on the needs identified in the training needs analysis.<br><br>C. The organisation conducts an evaluation of the driver training conducted. | A. The organisation conducts a training needs analysis for workers in relation to fleet driving. The training needs analysis should encompass:<br>(i) acknowledgement of prior driver training;<br>(ii) identification of training needs, including specific training, such as 4WD terrain training, driving in snow, fatigue management etc<br><br>B. The organisation provides driver training, as identified in the training needs analysis, for workers, as appropriate. This might include: training targeting specific skills or risks, risk avoidance training, defensive driver training, driver awareness training.<br><br>C. Regular review and evaluation of training and training materials is conducted by the organisation to monitor effectiveness and impact. |
| II | A. The organisation provides generic driver training for workers.<br><br>C. The organisation conducts an evaluation of the driver training conducted. | A. The organisation provides driver training to workers. This might include: risk avoidance training, defensive driver training, driver awareness training.<br><br>C. Evaluation of training and training materials is conducted by the organisation to monitor effectiveness and impact. |
| III | A. The organisation provides generic driver training for workers.<br><br>C. No evaluation is conducted regarding the driver training. | A. The organisation provides driver training to workers. This might include: risk avoidance training, defensive driver training, driver awareness training. |
| IV | D. The organisation does not provide driving training for workers. | D. No driver training programs for workers are conducted by the organisation. |

## 4. Vehicle technology, selection and maintenance

The organisation has in place fleet vehicle selection guidelines and conducts a regular program of fleet vehicle maintenance.

### 4.1 Fleet vehicle selection

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. The organisation has safe fleet vehicle selection guidelines that specify specific safety features that should be included in fleet vehicles.<br><br>B. Workers are consulted regarding vehicle selection.<br><br>C. Processes are in place to obtain worker feedback regarding fleet vehicles. | A. The organisation has fleet vehicle selection guidelines that specify specific safety features that should be included in fleet vehicles. These specify a vehicle with an ANCAP rating of 4 or 5, along with specific safety features, such as<br><br>front airbag, side curtain airbag, ABS brakes, stability control, parking sensors, advanced brake warning system, vehicle colour.<br><br>B. The organisation consults with workers regarding fleet vehicle selection.<br><br>C. There is a system in place for workers to provide feedback regarding the safety performance of fleet vehicles. |
| II | A. The organisation has safe fleet vehicle selection guidelines for fleet vehicles. | A. The organisation has fleet vehicle selection guidelines that specify the purchase of vehicles with an ANCAP rating of 4 or 5. |
| III | A. The organisation has some specific selection guidelines for safe fleet vehicles. | A. The organisation has fleet vehicle selection guidelines that include specific safety considerations. Safety features specified may include: front airbag, side curtain airbag, ABS brakes, stability control, parking sensors, advanced brake warning system, vehicle colour. |
| IV | A. The organisation selects vehicles on grounds other than safety. | A. No vehicle selection specifications or guidelines based on safety exist at organisation. |

## 4.2 Fleet vehicle maintenance

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. The organisation has a regular fleet vehicle maintenance schedule.<br><br>B. Vehicle condition is inspected regularly and defects are corrected in a timely way<br><br>C. Processes are in place for staff to report vehicle defects and to ensure action is taken on reports. | A. Routine vehicle maintenance is conducted on fleet vehicles consistent with, or better than, the manufacturers recommended maintenance standard for the vehicle.<br><br>Drivers conduct and sign off standardised pre-trip vehicle checks.<br><br>B. Fleet vehicle inspection and maintenance records are kept and include mechanic sign-off.<br><br>C. There is a mechanism in place for workers to report vehicle defects and a mechanism to ensure that vehicle defects are assessed and corrected in a timely manner. |
| II | A. The organisation has a regular fleet vehicle maintenance schedule.<br><br>C. Processes are in place for staff to report vehicle defects and to ensure action is taken on reports. | A. Routine vehicle maintenance is conducted on fleet vehicles consistent with the manufacturers recommended maintenance standard for the vehicle.<br><br>C. There is a mechanism in place for workers to report vehicle defects and a mechanism to ensure that vehicle defects are assessed and corrected in a timely manner. |
| III | B. The organisation does not have a fleet vehicle maintenance program, but processes are in place to report vehicle defects and action reported defects. | B. There is a mechanism in place for workers to report vehicle defects and a mechanism to ensure that vehicle defects are assessed and corrected in a timely manner. |
| IV | D. The organisation does not have a fleet maintenance program or a mechanism to report vehicle defects. | D. No routine fleet vehicle maintenance is conducted by the organisation and there is no mechanism to report vehicle defects. |

## 5. Vehicle journeys

The organisation recognises the role of journey planning, including the identification of safe routes and risk factor management.

### 5.1 Journey management

| | Strategic Criteria | Operational Criteria |
|---|---|---|
| I | A. The organisation recognizes the role of journey planning in safe driving through formal policies and procedures that encourage safer journey routes and scheduling or alternatives to driving. | A. The organisation has a formal mechanism to assess the need for trips.<br><br>The organisation has policies and procedures that seek to eliminate or reduce long journeys (e.g., encouraging the use of skype, teleconference meetings, or travel by other modes of transport for long trips)<br><br>The organisation provides staff with guidelines on journey planning (e.g., recommended limits on the number of km travelled per hour of driving, the distances driven in a single unbroken journey, break planning, safe route planning, etc) |
| II | A. The organisation recognizes the role of journey planning in safe driving and has formal policies and procedures around specific elements of journey risk. | A. Policies and procedures exist around specific journey risks, for example, journey planning for fatigue management, journey planning to avoid adverse conditions such as congestion or weather, journey planning to minimize time pressure) |
| III | A. The organisation recognizes the role of journey planning in safe driving and provides informal advisory material to drivers on aspects of safe journeys. | A. The organisation distributes information to staff about safe journey planning. For example, the organisation uses emails, newsletters or circulars, or has an on-line forum to convey messages to staff regarding safe journey planning issues. |
| IV | A. The organisation doe not promote vehicle journey management strategies. | A. No journey management strategies are promoted or encouraged by the organisation. |

**Fleet Safety Management Audit Tool**

**SCORING SHEET**

**Instructions**

Please complete the fleet safety audit tool and circle your organisation's score below for each category. After you have rated each category, add up the subtotals from each column and add them together to calculate the total score. The total score can then used to provide an indication of how the organisation is performing in relation to best practice fleet safety management.

| | **Rating** | | | | |
|---|---|---|---|---|---|
| **Categories** | **I** | **II** | **III** | **IV** | |
| **1.Management, systems and processes** | | | | | |
| 1.1 Management commitment | 3 | 2 | 1 | 0 | |
| 1.2 Fleet safety management | 3 | 2 | 1 | 0 | |
| 1.3 Communication regarding fleet safety | 3 | 2 | 1 | 0 | |
| **2. Monitoring and assessment** | | | | | |
| 2.1 Vehicle crash and incident investigation | 3 | 2 | 1 | 0 | |
| 2.2 Monitoring fleet safety performance | 3 | 2 | 1 | 0 | |
| 2.3 Performance monitoring and recognition | 3 | 2 | 1 | 0 | |
| **3. Employee recruitment, training and education** | | | | | |
| 3.1 Driver selection and assessment | 3 | 2 | 1 | 0 | |
| 3.2 Employee fleet safety induction | 3 | 2 | 1 | 0 | |
| 3.3 Driver training | 3 | 2 | 1 | 0 | |
| **4. Vehicle technology, selection and maintenance** | | | | | |
| 4.1 Fleet vehicle selection | 3 | 2 | 1 | 0 | |
| 4.2 Fleet vehicle maintenance | 3 | 2 | 1 | 0 | |
| **5. Vehicle journeys** | | | | | |
| 5.1 Journey management | 3 | 2 | 1 | 0 | **TOTAL** |
| **Sub total** | | | | | |

The total score can provide an indication of how the organisation is performing in relation to best practice fleet safety management.

| 0-7 | 8-14 | 15-21 | 22-28 | 29-36 |
|---|---|---|---|---|
| Poor | Well below best practice | Below best practice | Approaching best practice | Achieving best practice |

## 5. Conclusion

The fleet safety management audit tool was designed to identify the extent to which fleet safety is managed in an organisation compared to best practice. The audit tool can be used to conduct audits within an organisation to provide an indicator of progress in managing fleet safety and it can be used to benchmark performance with other organisations. The usability of the audit tool has been assessed with five companies and overall was rated easy to use and understand and useful for benchmarking fleet safety performance.

The current work represents the first, necessary step in the development of a standard measurement tool for light vehicle fleet safety management. Further work is now needed to test and refine the audit tool, particularly in view of the limitations of the current study. The audit tool was developed using the existing research in the area of light vehicle fleet safety together with the experience of a relatively small sample of Australian organisations operating light vehicle fleets. These organisations shared an interest in fleet management issues sufficient to join AfMA and to volunteer for the current study. They may represent organisations with, for example, greater levels of awareness or commitment to fleet safety than organisations that are not AfMA members or that did not volunteer. Alternatively, they may be organisations that find fleet safety management particularly challenging. Because the study participants were a small sample of organisations operating light vehicle fleets and because they may have differed systematically from other organisations, further research is needed to confirm that the audit tool is relevant to all types of light vehicle fleets.

The scoring system that was adopted in the audit tool assigned each subcategory of fleet safety management performance an equal weighting. This simple system was used because not enough is known about the relative effects of different fleet safety strategies to weight them meaningfully during scoring. Research to better understand the relative importance of the different audit tool subcategories for safety outcomes would allow the scoring system to be refined to reflect the varying impact of different management strategies.

From the research literature examined and the interviews conducted for the development of the fleet safety audit tool, there was no one strategy identified that, if performed well, would result in 'best practice' fleet safety performance. Rather combinations of strategies were used to manage fleet safety in organisations. However, the research literature did not identify which were the best combinations of fleet safety strategies that an organisation should adopt in order to reach best practice in fleet safety management. Further research is needed in this area to identify which combinations of fleet safety strategies are the most successful in managing fleet safety performance.

Further refinement and testing of the audit tool is likely to be required in the future as fleet safety practices and vehicle safety features improve and as research sheds new light on the effectiveness of existing fleet safety management practices. In addition, future research should assess the effectiveness of the fleet safety management audit tool in helping to reduce vehicle crashes and costs as this would be the ultimate test of the usefulness of the audit tool for light vehicle fleet safety management.

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# 7. Appendices

***Appendix 1 Expression of interest email***

**DEVELOPMENT OF A FLEET SAFETY MANAGEMENT AUDIT TOOL**

The University of New South Wales (UNSW) and the Australasian Fleet Managers Association (A*f*MA) are developing a fleet safety management self-audit tool. It is hoped that the tool will allow organisations to assess their fleet safety management practices against a standard criteria.

Your organisation is invited to participate in the development of the tool. As the person responsible for the management of your organisations fleet, participation will involve a 30-40 minute telephone interview; interview questions will be provided to you prior to the interview.

We are seeking your comments and views on your experiences with fleet safety management practices and vehicle crashes. You will also be asked about any fleet safety issues that you feel are not addressed by current management practices.

In addition to your participation we would also undertake a 30 minute interview with one or two drivers from your organisation regarding their experience of fleet safety management.

Participation in this research is voluntary and all information provided will be treated as confidential and will not be shared or distributed to any other participants or organisations including A*f*MA.

If you would like to participate or would like further information about the research project, please contact Rebecca Mitchell at r.mitchell@unsw.edu.au

Your decision whether or not to participate will not prejudice your future relations with UNSW, A*f*MA, or your employer.

***Appendix 2 - Participation information sheet, consent form and Fleet manager background questionnaire***



***PARTICIPANT INFORMATION STATEMENT AND CONSENT FORM***
***DEVELOPMENT OF A FLEET SAFETY MANAGEMENT AUDIT TOOL***

**UNSW HREA reference number: 9_10_018**

**UNSW HREC reference number: 10212**

The University of New South Wales (UNSW) and the Australasian Fleet Safety Management Association (AFMA) are developing a fleet safety management self-audit tool. It is hoped that the safety audit tool will allow organisations to assess their fleet safety management practices against standard criteria. This research is being funded by the WorkCover Assist Applied Research Program.

Your organisation was invited to participate in the development of a fleet safety management audit tool. Participation will involve you completing a short background survey and a 30-40 minute interview, either by telephone or in-person at your workplace. You will be asked questions about fleet safety management and to comment, from your experience, on fleet safety management practices associated with a lower or higher rate of vehicle crashes and/or occupant injuries. You will also be asked about any fleet safety issues that you feel are not addressed by current management practices.

Participation in this research is voluntary. You may decline to answer any interview questions you may not feel comfortable about and you are free to withdraw from the interview at any time, without being penalised in any way. If you are willing, the interview will be recorded. Once key information relating to fleet safety management has been extracted from the interview and noted, these recordings will be erased. Information obtained during the recordings will only be used for research purposes pertaining to the development of the self-audit tool.

All information obtained as part of this research will be confidential and you will not be individually identified. We plan to use information that we gather from interviews and from the published literature to develop a fleet safety management self-audit tool. A summary of the results of the trial will be available in *FleetDrive,* AFMA's newsletter, for your information.

If you are willing to participate in an interview to assist with the development of the fleet safety management audit tool, please fill out and sign the participant consent form.

If you would like further information about this study please contact Dr Rebecca Mitchell on 9385 7379 or at r.mitchell@unsw.edu.au or Ms Lori Mooren on 9385 5666 or lori.mooren@unsw.edu.au

Your decision whether or not to participate will not prejudice your future relations with UNSW, the AfMA, or your employer. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice.

Any complaints may be directed to the Ethics Secretariat, The University of New South Wales, Sydney NSW 2052 (Phone: 9385 4234 or email: ethics.sec@unsw.edu.au). Any complaint that you make will be treated in confidence and investigated, and you will be informed of the outcome.

**PARTICIPANT INFORMATION STATEMENT AND CONSENT FORM (continued)**

**DEVELOPMENT OF A FLEET SAFETY MANAGEMENT SELF-AUDIT TOOL**

**NSW HREA reference number: 9_10_018**

**UNSW HREC reference number: 10212**

**You are making a decision whether or not to participate. Your signature indicates that, having read the information provided above, you have decided to participate.**

I understand I will be contacted by the University of NSW research staff to participate in this research via my contact details below:

Telephone: _____

Email: _____

I agree to have my interview recorded, with the knowledge that once key information regarding fleet safety management practices has been extracted and noted for this research, it will be erased *(please tick)*.

❑YES ❑NO

……
Signature

…… ……

(Please PRINT name) Date

This Consent Form should be forwarded to: Dr Rebecca Mitchell, NSW Injury Risk Management Research Centre, G2 Western Campus, University of NSW Sydney 2052. Fax: (02) 9385 6040 or email r.mitchell@unsw.edu.au

**REVOCATION OF CONSENT**
**DEVELOPMENT OF A FLEET SAFETY MANAGEMENT SELF-AUDIT TOOL**

**UNSW HREA reference number: 9_10_018**

**UNSW HREC reference number: 10212**

I hereby wish to **WITHDRAW** my consent to participate in the research proposal described above and understand that such withdrawal **WILL NOT** jeopardise any treatment or my relationship with The University of New South Wales, the Australasian Fleet Safety Management Association, or my employer.

…… ……

Signature Date

……

Please PRINT Name

The section for Revocation of Consent should be forwarded to: Dr Rebecca Mitchell, NSW Injury Risk Management Research Centre, G2 Western Campus, University of NSW Sydney 2052. Fax: (02) 9385 6040 or email r.mitchell@unsw.edu.au

**Instructions**

As you know, we are interviewing Fleet Safety Managers from different organisations to learn how light vehicle (up to and including 4.5 tonnes GVM) fleet safety is currently being managed.

Thank you for agreeing to participate in an interview.

In preparation for the interview, we wish to gather some basic background information about you, the light fleet and drivers you manage and driver safety at your organisation.

Please complete the background questions on the following pages.
You can return them to us by fax (02 9385 6040) or by scanning the completed survey and emailing it to Dr Rebecca Mitchell (r.mitchell@unsw.edu.au).

or

Lori.mooren@unsw.edu.au

If you have any questions, Rebecca will be happy to help (02 9385 7379; r.mitchell@unsw.edu.au).

**Background information**

**About you**

1) What is your current job title? _____

2) How long have you worked in this role:

- in your current organisation? _____ years
- in total in your career? _____ years

3) Is your occupational background mainly in:

- Fleet management? ☐ Yes ☐ No
- Logistics/transport planning? ☐ Yes ☐ No
- Occupational Health and Safety? ☐ Yes ☐ No
- Administration? ☐ Yes ☐ No
- Operations? ☐ Yes ☐ No

  If yes, what sort of operations did you work in? _____

- Other? ☐ Yes ☐ No

  If yes, please describe: _____

4) Are you ☐ Male? or ☐ Female?

5) What is your age? _____ years

**About the fleet**

6) How many light vehicles are in the fleet you manage? *(If none, write '0'.)*

a) Passenger vehicles *(e.g., sedans, station wagons, 4WD/SUVs )* _____ vehicles

b) Utes and twin cabs _____ vehicles

c) Light commercial vans _____ vehicles

d) Light trucks up to and including 4.5 tonnes GVM _____ vehicles

e) Light Buses _____ vehicles

f) Motorcycles _____ vehicles

g) Other light vehicles *(not including plant)* _____ vehicles

What are these 'other' vehicles? _____

7) Does your fleet also include heavy trucks over 4.5 tonnes GVM or heavy buses?

☐ No ☐ Yes If yes, how many heavy vehicles? _____

8) Focussing only on the light vehicles that are in your fleet at the moment, what percentages are:

- Purchased? _____ %
- Leased? _____ %
- On short-term hire? _____ %
- Held under some other arrangement _____ %

**TOTAL 100 %**

9) Does your organisation enter into novated vehicle lease arrangements with staff?

☐ No ☐ Yes If yes, how many vehicles are leased to staff? _____

10) How many light vehicles in your fleet:

- are dedicated to a single driver? _____ vehicles
- are available for use by many drivers? _____ vehicles

11) Does your organisation allow staff to use their privately owned vehicles for business purposes?

☐ No ☐ Yes

**About the fleet drivers and driving**

12) How many staff in the following occupation groups drive the light fleet vehicles at your organisation?
*(If none, write '0'.)*

- Professional drivers _____ people
- Managers and administrative staff _____ people
- Professional or paraprofessional staff _____ people
- Salespeople _____ people
- Technical or trades staff _____ people
- Other staff _____ people

What types of jobs do these 'other' staff do? _____

13) How many kilometres are driven by staff in your light fleet vehicles each year?

- Total kilometres for the fleet: _____ km
- Average kilometres per vehicle: _____ km
- Average kilometres per driver: _____ km

14) What percentage of the light fleet drivers at your organisation drive fleet vehicles:

- On most days? _____ % of fleet drivers
- Once or twice a week? _____ % of fleet drivers
- About once a fortnight? _____ % of fleet drivers
- Only occasionally? _____ % of fleet drivers

**TOTAL 100 %**

**About the fleet safety**

15) In the last 12 months how many crashes have been recorded for light vehicles in your fleet:

- with vehicle or property damage only? _____ crashes
- with injury to staff? _____ crashes
- with injury to third parties? _____ crashes

16) Who holds the primary responsibility for managing light fleet safety functions in your organisation?

*(please tick one)*

☐ Fleet Manager?

☐ Occupational Health and Safety Manager?

☐ Risk Manager/Insurance Manager?

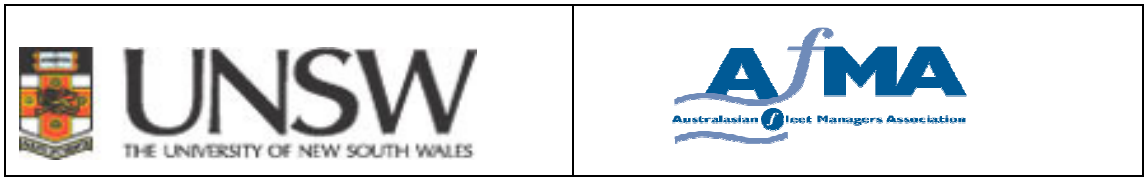
☐ Senior Management (e.g., CEO, Managing Director, Board etc)?

☐ Other? What are these positions: _____

17) Where in the organisational hierarchy does this person sit?

Please draw (or attach) a simple organisational chart that shows the lines of reporting and authority for this person relative to the other layers of Management. Please ensure that the Fleet Manager and OHS Manager positions are included in the chart.

*Appendix 3 – Fleet manager interview questions*




**Fleet Manager interview questions**

**For the first couple of questions, I am going to ask you about fleet safety management practices you have experienced or implemented and how successful you think these practices have been in managing fleet safety.**

1. What practices have you used to manage fleet safety in this company? (eg. specific policies, education)

2. In your opinion, how successful do you feel each of these practices have been? And why?

3. Have there been any practices that you stopped because you didn't think they were effective in managing fleet safety?

4. In your opinion, what are the 3 main factors that assist you in managing fleet safety in this company?

5. In your opinion, what are the 3 main barriers for you in implementing practices to manage fleet safety?

**For the next couple of questions, I would like you to think about fleet safety management practices and whether you think any of these practices are associated with a lower or higher rate of vehicle crashes.**

6. In your experience (not just at your current company), are there any practices used to manage fleet safety that you think reduce the risk of fleet vehicle crashes and related injuries?

7. In your opinion, what do you consider are the 3 essential practices to reduce the risk of fleet vehicle crashes?

8. In your experience (not just at your current company), are you aware of any practices used to manage fleet safety that have increased the risk of fleet vehicle crashes?

**For the next question, I would like you to consider any fleet safety issues that you feel are not addressed by current management practices.**

9. From your experience (not just at your current company), are they any areas where you think more could be done to manage fleet safety? If so, what areas?

**Lastly, I am going to ask you about your opinion of a couple of fleet safety management practices.**

10. We have been reading material written about fleet safety that have identified some additional areas that could be associated with good and poor fleet safety management practices. From your experience, we would like to get your opinion on these additional areas and whether from your experience they have any impact on fleet safety management.

In your opinion, do any of the following practices have an impact on feet safety and why?:

(a) **Management, systems and procedures**

- Management leadership and commitment for fleet safety

☐ Yes ☐ No ☐ Don't know

- Having in place company policies, guidelines or procedures that address fleet safety

☐ Yes ☐ No ☐ Don't know

- Having cooperation between departments in an organisation regarding fleet safety responsibilities (eg. HR and OHS)

☐ Yes ☐ No ☐ Don't know

- Having a system in place to record information regarding any vehicle crashes or worker injuries

☐ Yes ☐ No ☐ Don't know

- Adopting a risk management or preventive approach to vehicle crashes

☐ Yes ☐ No ☐ Don't know

- The safety culture of an organisation

☐ Yes ☐ No ☐ Don't know

- Concern for the company's image

☐ Yes ☐ No ☐ Don't know

- Having consultation between management and workers regarding safety issues (ie. involving workers in decision making)

☐ Yes ☐ No ☐ Don't know

- Contracting out of services

☐ Yes ☐ No ☐ Don't know

### (b) **Monitoring and assessment**

- Conducting audits or evaluating fleet safety practices (eg. participation in an accreditation scheme or self-auditing)

☐ Yes ☐ No ☐ Don't know

- Conducing driver performance monitoring and feedback (eg. in-vehicle monitoring)

☐ Yes ☐ No ☐ Don't know

- Analysing and reviewing past vehicle crash trends

☐ Yes ☐ No ☐ Don't know

### (c) **Vehicle selection and maintenance**

- Having vehicle selection guidelines in place (eg. ABS brakes)

☐ Yes ☐ No ☐ Don't know

- Conducting routine vehicle maintenance

☐ Yes ☐ No ☐ Don't know

Conducing pre-vehicle trip inspections

☐ Yes ☐ No ☐ Don't know

### (d) **Employee recruitment, training and education**

- Using employee selection procedures (eg. licence checks, eye sight checks, driver history)

☐ Yes ☐ No ☐ Don't know

- Conducting employee induction training

☐ Yes ☐ No ☐ Don't know

- Conducting employee education and training (eg defensive driver training, skid training, manoeuvring)

☐ Yes ☐ No ☐ Don't know

- Driver safety awareness program

☐ Yes ☐ No ☐ Don't know

- Producing and distributing a fleet safety newsletter

☐ Yes ☐ No ☐ Don't know

- Having fleet safety working groups or discussion groups

☐ Yes ☐ No ☐ Don't know

### (e) Performance-based incentives and disincentives

- Rewarding drivers for good or improved vehicle safety performance (eg recognition, bonus)

☐ Yes ☐ No ☐ Don't know

- Having disincentives for drivers for poor or worse vehicle safety performance

☐ Yes ☐ No ☐ Don't know

### (f) Vehicle journeys

- Reviewing the route travelled by drivers for possible safety issues

☐ Yes ☐ No ☐ Don't know

- Using risk management strategies to reduce the risk of vehicle crashes (eg. for speed, fatigue)

☐ Yes ☐ No ☐ Don't know

### (g) Driver characteristics

- Employing older drivers

☐ Yes ☐ No ☐ Don't know

- Employing younger drivers

☐ Yes ☐ No ☐ Don't know

- A driver's attitude to safe driving/ road safety

☐ Yes ☐ No ☐ Don't know

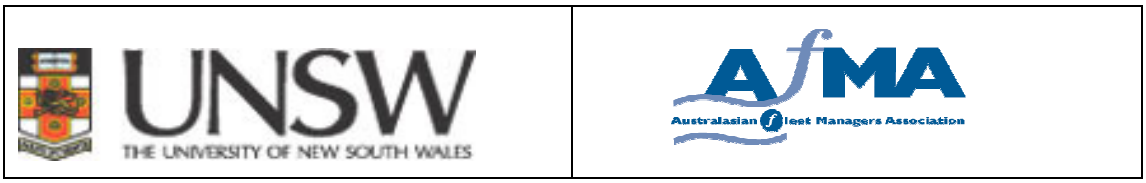
- A driver's road traffic violation history (eg speeding tickets)

☐ Yes ☐ No ☐ Don't know

- Work pressure on drivers

☐ Yes ☐ No ☐ Don’t know

***Appendix 4 – Fleet driver background questionnaire***




**Instructions**

As you know, we are interviewing people who drive light fleet vehicles (up to and including 4.5 tonnes GVM) for work in different organisations. We hope to learn about how occupational light vehicle safety is managed.

Thank you for agreeing to participate in an interview.

In preparation for the interview, we wish to gather some basic background information about you and your work driving.

Please complete the background questions on the following pages.
You can return them to us by fax (02 9385 6040) or by scanning the completed survey and emailing it to Dr Rebecca Mitchell (r.mitchell@unsw.edu.au).

If you have any questions, Rebecca will be happy to help (02 9385 7379; r.mitchell@unsw.edu.au).

**Background information**

1) What is your current job title? _____

2) Which of the following best describes your job in the organisation? *(please tick one option)*

- ☐ Professional driver
- ☐ Manager or administrative officer
- ☐ Professional or paraprofessional
- ☐ Salesperson
- ☐ Technical or trades person
- ☐ Other Please describe your job _____

3) How long have you worked:

- in this organisation? _____ years
- in your current job? _____ years

4) Are you ☐ Male? or ☐ Female?

5) What is your age? _____ years

6) How long have you held a full drivers' licence? _____ years

7) What sort of light vehicle do you usually drive for work? *(please tick one option)*

- ☐ Passenger vehicle *(e.g., sedans, station wagons, 4WD/SUVs )*
- ☐ Ute or twin cab
- ☐ Light commercial van
- ☐ Light truck up to and including 4.5 tonnes GVM
- ☐ Light Bus
- ☐ Motorcycle
- ☐ Other light vehicle *(not including plant)*

What is this 'other' vehicle? _____

8) How often do you drive a light vehicle for work? *(please tick one option)*

- ☐ On most days
- ☐ Once or twice a week
- ☐ About once a fortnight
- ☐ Only occasionally

9) When you drive a light vehicle for work, how many kilometres do you usually drive in a day?

*(please tick one option)*

- ☐ Less than 50km
- ☐ 50 to 100km
- ☐ 100 to 500km
- ☐ more than 500km

10) When you drive a light vehicle for work, do you usually use: *(please tick one option)*

- ☐ a vehicle from the company pool that is available for other staff to use?
- ☐ a company vehicle that is designated for you alone to use?
- ☐ a vehicle on which you have a novated lease arranged through your workplace?
- ☐ your own privately-owned vehicle?

11) In the last 12 months have you had a crash while driving a light vehicle for work where:

- vehicles or property were damaged? ☐ No ☐ Yes
- you were injured? ☐ No ☐ Yes
- someone else was injured? ☐ No ☐ Yes

12) Who holds the primary responsibility for managing light fleet safety functions in your organisation?

*(please tick one)*

☐ Fleet Manager

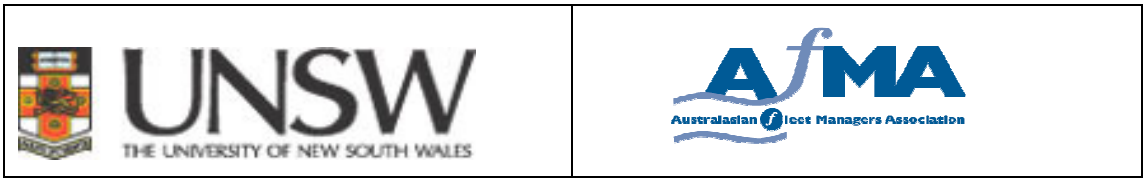
☐ Occupational Health and Safety Manager

☐ Risk Manager/Insurance Manager

☐ Senior Management (e.g., CEO, Managing Director, Board etc)

☐ Other What is this position: _____

*Appendix 5 – Fleet driver interview questions*




**Driver interview questions**

**For the first couple of questions, I am going to ask you about fleet safety management practices you have experienced and how successful you think these practices have been in managing fleet safety.**

1. What practices does the company use to ensure driver's safety? (eg. specific policies, education)

2. In your opinion, how successful do you feel each of these practices have been? And why?

3. Are you aware of any practices that the company stopped because they didn't think they were benefiting driver's safety?

4. In your opinion, what are the 3 main factors that are used to promote fleet safety in the company?

5. In your opinion, what are the 3 main barriers for you as a driver in staying safe on the roadway?

**For the next couple of questions, I would like you to think about fleet safety management practices and whether you think any of these practices are associated with a lower or higher rate of vehicle crashes.**

6. In your experience (not just at your current company), are there any practices used to manage safety that you think reduce the risk of fleet vehicle crashes and related injuries?

7. In your opinion, what do you consider are the 3 essential practices to reduce the risk of fleet vehicle crashes?

8. In your experience (not just at your current company), are you aware of any practices used to manage safety that have increased the risk of fleet vehicle crashes?

**For the next question, I would like you to consider any fleet safety issues that you feel are not addressed by current management practices.**

9. From your experience (not just at your current company), are they any areas where you think more could be done to manage fleet safety? If so, what areas?

**Lastly, I am going to ask you about your opinion of a couple of fleet safety management practices.**

10. We have been reading material written about fleet safety that have identified some additional areas that could be associated with good and poor fleet safety management practices. From your experience, we would like to get your opinion on these additional areas and whether from your experience they have any impact on fleet safety management.

In your opinion, do any of the following practices have an impact on feet safety and why?:

### (a) Management, systems and procedures

- Management leadership and commitment for fleet safety

☐ Yes ☐ No ☐ Don't know

- Having in place company policies, guidelines or procedures that address fleet safety

☐ Yes ☐ No ☐ Don't know

- Having cooperation between departments in an organisation regarding fleet safety responsibilities (eg. HR and OHS)

☐ Yes ☐ No ☐ Don't know

- Having a system in place to record information regarding any vehicle crashes or worker injuries

☐ Yes ☐ No ☐ Don't know

- Adopting a risk management or preventive approach to vehicle crashes

☐ Yes ☐ No ☐ Don't know

- The safety culture of an organisation

☐ Yes ☐ No ☐ Don't know

- Concern for the company's image

☐ Yes ☐ No ☐ Don't know

- Having consultation between management and workers regarding safety issues (ie. involving workers in decision making)

☐ Yes ☐ No ☐ Don't know

- Contracting out of services

☐ Yes ☐ No ☐ Don't know

### (b) **Monitoring and assessment**

- Conducting audits or evaluating fleet safety practices (eg. participation in an accreditation scheme or self-auditing)

☐ Yes ☐ No ☐ Don't know

- Conducing driver performance monitoring and feedback (eg. in-vehicle monitoring)

☐ Yes ☐ No ☐ Don't know

- Analysing and reviewing past vehicle crash trends

☐ Yes ☐ No ☐ Don't know

### (c) **Vehicle selection and maintenance**

- Having vehicle selection guidelines in place (eg. ABS brakes)

☐ Yes ☐ No ☐ Don't know

- Conducting routine vehicle maintenance

☐ Yes ☐ No ☐ Don't know

- Conducing pre-vehicle trip inspections

☐ Yes ☐ No ☐ Don't know

### (d) **Employee recruitment, training and education**

- Using employee selection procedures (eg. licence checks, eye sight checks, driver history)

☐ Yes ☐ No ☐ Don't know

- Conducting employee induction training

☐ Yes ☐ No ☐ Don't know

- Conducting employee education and training (eg defensive driver training, skid training, manoeuvring)

☐ Yes ☐ No ☐ Don't know

- Driver safety awareness program

☐ Yes ☐ No ☐ Don't know

- Producing and distributing a fleet safety newsletter

☐ Yes ☐ No ☐ Don't know

- Having fleet safety working groups or discussion groups

☐ Yes ☐ No ☐ Don't know

### (e) Performance-based incentives and disincentives

- Rewarding drivers for good or improved vehicle safety performance (eg recognition, bonus)

☐ Yes ☐ No ☐ Don't know

- Having disincentives for drivers for poor or worse vehicle safety performance

☐ Yes ☐ No ☐ Don't know

### (f) Vehicle journeys

- Reviewing the route travelled by drivers for possible safety issues

☐ Yes ☐ No ☐ Don't know

- Using risk management strategies to reduce the risk of vehicle crashes (eg. for speed, fatigue)

☐ Yes ☐ No ☐ Don't know

### (g) Driver characteristics

- Employing older drivers

☐ Yes ☐ No ☐ Don't know

- Employing younger drivers

☐ Yes ☐ No ☐ Don't know

- A driver's attitude to safe driving/ road safety

☐ Yes ☐ No ☐ Don't know

- A driver's road traffic violation history (eg speeding tickets)

☐ Yes ☐ No ☐ Don't know

- Work pressure on drivers

☐ Yes ☐ No ☐ Don't know

## *Appendix 6 – Usability assessment*

### Instruction email

Thank you for agreeing to take part in the pilot testing of the draft fleet safety management audit tool. As you know, we are interested in how easy the tool is to use and how it could be improved. Three documents are attached to this email that you will need to use. The first is the draft fleet safety management audit tool and the second is the audit tool scoring sheet. The third is the usability survey.

**Before you begin**, please answer the question on page 1 of the usability survey. We are interested in your opinion of fleet safety management in your organisation, before you start using the self-audit tool.

#### Using the audit tool

The first couple of pages of the draft fleet safety management audit tool describe the development, aim and structure of the audit tool and how it works. Please work through the audit tool indicating your organisation's rating for each sub-category on the separate scoring sheet. Once you are finished add up your total score.

#### Usability survey

Please complete the usability survey and return to Rebecca Mitchell at r.mitchell@unsw.edu.au or fax 9385 6637 by 18TH April 2011.

**Usability Survey**

**Instructions**

As you know, we are pilot testing a draft fleet safety management audit tool. The audit tool was designed for light vehicle fleets only (i.e., vehicles up to and including 4.5 tonnes GVM). With the audit tool we hope to be able to learn more about management of occupational light vehicle safety.

Thank you for agreeing to participate in the testing of the draft fleet safety management audit tool.

Before you begin, please answer the following question:

How would you rate your fleet safety management practices prior to undertaking the self-audit tool? *(Please tick one)*

| ☐ | ☐ | ☐ | ☐ | ☐ |
|---|---|---|---|---|
| Poor | Well below best practice | Below best practice | Approaching best practice | Achieving best practice |

Now, please read the instructions and use the draft audit tool to review and rate your organisation's fleet safety management practices. Please note any queries or problems you may have using the draft tool.

After using the draft audit tool, please complete the questions on the following pages regarding the audit tool.

You can return this completed survey and any comments you may have made directly on the draft audit tool to us by fax (02 9385 6637) or by scanning and/or emailing it to Rebecca Mitchell (r.mitchell@unsw.edu.au).

If you have any questions, Rebecca will be happy to help (02 9385 7555; r.mitchell@unsw.edu.au).

**Fleet safety management audit tool usability assessment**

**1. Usability and completeness of the fleet safety management audit tool**

1.1 Overall, how easy to use did you find the fleet safety management audit tool? *(Please indicate)*

☐ Easy to use ☐ Okay to use, if revised ☐ Problematic to use ☐ Not easy to use

1.2 If you did not answer 'easy to use', how would you like to see the audit tool changed to make it more easy to use? *(Please describe)*

_____
_____
_____
_____

1.3 The following questions ask you to rate each of the fleet safety audit tool categories:

| | Management, systems & processes | Monitoring & assessment | Employee recruitment, training & education | Vehicle technology, selection & maintenance | Vehicle journeys |
|---|---|---|---|---|---|
| a. Was the language clear and easy to understand? | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No |
| b. Did you have any problems interpreting any criteria? | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No |
| c. Was there enough information in the criteria to identify the level appropriate for your organisation? | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No |
| d. Did the criteria assist to identify any strengths or weaknesses in fleet safety management? | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No |
| e. Could you use the criteria in this category as a guide for planning improvements? | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No |

1.4 If you had problems using the criteria, how would you like to see the criteria altered? *(Please describe)*

_____
_____
_____
_____
_____

1.5 Are there any topics that you think should be added to the fleet safety management audit tool and why?

_____
_____
_____
_____

1.6 Are there any topics that you think should be removed from the fleet safety management audit tool and why?

_____
_____
_____
_____

**2. Usefulness of the fleet safety management audit tool**

2.1 Did you find the fleet safety management audit tool useful for identifying areas where fleet safety management could be improved? *(Please indicate)*

☐ Yes ☐ No

2.2 If you answered no, how would you like to see the audit tool changed to make it more useful for identifying areas where fleet safety could be improved? *(Please describe)*

_____
_____
_____
_____

2.3 How did your organisation's fleet safety management practices rate using the self-audit tool? *(Please indicate)*

| ☐ | ☐ | ☐ | ☐ | ☐ |
|---|---|---|---|---|
| Poor | Well below best practice | Below best practice | Approaching best practice | Achieving best practice |

2.4 Are you interested in using an audit tool to benchmark your organisation's fleet safety management practices? *(Please indicate)*

☐ Yes ☐ No

2.5 How useful would this fleet safety management audit tool be for benchmarking your organisation? *(Please indicate)*

☐ Very useful ☐ Useful ☐ Somewhat useful ☐ Not useful

2.6 How often would you suggest the fleet safety management audit tool should be used? *(Please indicate)*

☐ 6 monthly ☐ 12 monthly ☐ Every 2 years ☐ Other _____

2.7 Do you have any other comments regarding the fleet safety management audit tool?

_____
_____
_____
_____

**DRAFT Fleet Safety Management Audit Tool**

**SCORING SHEET**

**Instructions**

Please complete the fleet safety audit tool and circle your organisation's score below for each category.

After you have rated each category, add up the subtotals from each column and add them together to calculate the total score. The total score can then used to provide an indication of how the organisation is performing in relation to best practice fleet safety management.

| | Rating | | | | |
|---|---|---|---|---|---|
| **Categories** | **I** | **II** | **III** | **IV** | |
| **1.Management, systems and processes** | | | | | |
| 1.1 Management commitment | 3 | 2 | 1 | 0 | |
| 1.2 Fleet safety management | 3 | 2 | 1 | 0 | |
| 1.3 Communication regarding fleet safety | 3 | 2 | 1 | 0 | |
| **2. Monitoring and assessment** | | | | | |
| 2.1 Vehicle crash and incident investigation | 3 | 2 | 1 | 0 | |
| 2.2 Monitoring fleet safety performance | 3 | 2 | 1 | 0 | |
| 2.3 Performance monitoring and recognition | 3 | 2 | 1 | 0 | |
| **3. Employee recruitment, training and education** | | | | | |
| 3.1 Driver selection and assessment | 3 | 2 | 1 | 0 | |
| 3.2 Employee fleet safety induction | 3 | 2 | 1 | 0 | |
| 3.3 Driver training | 3 | 2 | 1 | 0 | |
| **4. Vehicle technology, selection and maintenance** | | | | | |
| 4.1 Fleet vehicle selection | 3 | 2 | 1 | 0 | |
| 4.2 Fleet vehicle maintenance | 3 | 2 | 1 | 0 | |
| **5. Vehicle journeys** | | | | | |
| 5.1 Journey management | 3 | 2 | 1 | 0 | **TOTAL** |
| **Sub total** | | | | | |

The total score can provide an indication of how the organisation is performing in relation to best practice fleet safety management.

| 0-7 | 8-14 | 15-21 | 22-28 | 29-36 |
|---|---|---|---|---|
| Poor | Well below best practice | Below best practice | Approaching best practice | Achieving best practice |

***Appendix 7 – NSW*** *legislative requirements and relevant guidance publications relating to fleet safety*

NSW Occupational Health and Safety Legislation:

- Occupational Health and Safety Act 2000 No 40.
- Occupational Health and Safety Regulation 2001.

NSW Codes of Practice:

- OHS Consultation – effective decision making and how to establish workplace OHS consultation arrangements: Code of Practice. WorkCover NSW, 2001.
- Risk Assessment: Code of Practice, WorkCover NSW, 2001.

NSW guidance publications:

- Risk management at work guide. WorkCover NSW, 2001.
- Health and safety notes: Hierarchy of hazard controls. WorkCover NSW.
- Fatigue prevention in the workplace. WorkCover NSW, 2008.
- Transport and storage industry fatigue resource. WorkCover NSW.

NSW Centre for Road Safety guidance materials:

Advisory material on driving hazards and safer work driving is available at http://www.rta.nsw.gov.au/roadsafety/index.html