

DEPARTMENT OF TRANSPORT AND COMMUNICATIONS

FEDERAL OFFICE OF ROAD SAFETY

DOCUMENT RETRIEVAL INFORMATION

Report No.	Date	Pages	ISBN	ISSN
CR 122	June 1993	199	0 642 51292 2	0810 770X

Title and Subtitle

Strategies to Combat Fatigue in the long Distance Road Transport Industry: The Bus and Coach Perspective

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Abstract

This report aims to identify effective and practicable strategies to reduce driver fatigue in the long distance bus and coach industry. Information was collected using consultations with industry representatives and a survey of 250 drivers, to determine the extent of the problem and attitudes to a range of possible solutions. Results are analysed across a range of different operational and employment conditions.

Keywords

driver fatigue, bus, coach, two-up driving, staged driving.

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The Bus and Coach Perspective

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Sydney, Australia - May 1993

ACKNOWLEDGEMENTS

We are grateful to the drivers who participated in this study for the time and effort they put into their responses. We also appreciate the interest and participation of representatives from the various industry groups.

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EXECUTIVE SUMMARY

This study was commissioned by the Federal Office of Road Safety to investigate ways to better manage driver fatigue in the long distance road transport industry. To this end, the study was designed to have two stages. The first stage was to involve gathering information about the strategies that would be both effective and practicable in reducing driver fatigue and the second stage was to involve the evaluation of the most promising strategies to emerge from the first stage of the study.

As part of the first stage, results of consultations with international authorities and Australian industry representatives as well as the results of the survey of 960 drivers from the freight sector were reported in an earlier report. In recognition of the operational differences between the freight and passenger sectors of the industry, drivers from the passenger sector were separately surveyed. This report is a description of the results of the survey of views of drivers in the bus and coach sector.

Information was gathered from 250 long distance bus and coach drivers using the questionnaire designed at the outset of Stage 1 of the study. Previously the questionnaire had been developed for the freight sector whereas this time it was adapted for the passenger sector. The aim was to keep the questionnaires used in the different sectors functionally similar in order for comparisons to be possible between the sectors, but to adapt it to cater to the nature of the work of the sector being surveyed, in this case the bus and coach drivers. The questionnaire was self administered or administered by interview in all mainland states except the ACT. For self

administration, questionnaires were mainly distributed through companies, although a substantial proportion were handed directly to drivers at a transit depot. All interviews were carried out at company depots.

The questionnaire obtained details of drivers' experience and working conditions as well as details of their last trip and their last working week. Drivers were also asked for their views and experience of driver fatigue, including the effects of fatigue on driving, what factors contribute to their fatigue, how they presently deal with the problem and their views about the same range of strategies that could be used to combat driver fatigue as presented to other sectors of the industry.

Analysis of the results was performed for the entire sample and for different sectors of the industry. Drivers doing tour and express work were compared, and drivers working in single, two-up and staged operations were also compared.

The results showed that although fatigue is a problem for coach drivers, it is not of the same order of magnitude as for truck drivers. The majority of bus and coach drivers considered fatigue a substantial problem for the industry, but most drivers reported that fatigue was not a major problem for them personally, with relatively few of them reporting fatigue on the last trip or on most trips. Truck drivers, in contrast, were much more likely to report experiencing fatigue.

The experience of fatigue once it occurred was remarkably consistent. Typically, bus and coach drivers reported fatigue before the 10th hour of work and most commonly occurring in the early hours of the morning. Most drivers reported that fatigue adversely affected their driving by making them slower to react, poorer in gear changing and poorer in the amount of attention to other traffic and

traffic signs. These consequences of fatigue are very similar to those reported by truck drivers. Clearly, fatigue affects the driving task in highly specific ways that appear to be well known to professional drivers no matter what vehicle they drive. Factors commonly judged to contribute to fatigue were again remarkably similar to those nominated by truck drivers, including dawn driving, inadequate sleep before the trip, either due to personal or work factors, and long driving hours.

Thus, although the extent of the problem of fatigue is different between industry sectors, there are similarities in the way that it occurs. This is hardly surprising since, clearly, the task of driving itself is much the same, irrespective of whether the vehicle is a bus or a truck. The survey revealed that there are also similarities in the work of truck and bus drivers. The two groups reported covering similar distances, with the similar proportions of each group reporting trips of very long duration. Most trips for both sectors were in the Eastern states, and bus drivers, like truck drivers, were likely to have worked in the previous week and to have worked overnight.

However, the results also revealed important differences related to the finding that fatigue is less of a problem in the coach sector. Almost half of bus and coach drivers reported doing short trips and starting in the daylight hours. In contrast, it was much less common for truck drivers to report short trips, and many of them started their trips in the midnight to dawn hours, the time when fatigue was reported to be most likely. In addition, bus and coach drivers were more likely to break up the driving task with other work activities, therefore being less exposed to long monotonous periods of uninterrupted driving than truck drivers.

The analysis of influences on drivers from different parts of the passenger sector revealed some important differences in the nature of the work done by coach drivers. The two main types of long distance driving reported in the bus and coach sector were tour and express driving. Given the different focus of these two types of driving, touring versus commuting, it could be expected that drivers would report major differences in the nature of their tasks. The purpose of the comparison was to examine whether specific differences in the way that work is arranged has implications for driver fatigue. For tour drivers, the driving task involved covering much longer distances spread out over much longer periods of time. Express drivers were much more likely to start their trips at night, and to drive overnight. Tour drivers reported taking longer breaks more frequently and spent proportionally more of their trips in breaks and in non-driving work activities. From the description of the characteristics of their work, it is clear that, despite the common element of long distance coach driving, these two groups do their work very differently, reflecting the commuter nature of express work and the sight-seeing nature of touring work.

From these results, it is clear that greater time pressure is placed on express drivers, with their commuter demands. Despite these quite fundamental differences in the way that work is arranged for them, the two groups were nevertheless quite similar in terms of reported fatigue on the last trip. Express drivers did, however, report fatigue overall as more of a problem for them than did tour drivers. Clearly, each type of driving has pressures and offsets which modify experience of fatigue.

Analysis of the influence of type of operation revealed that the driving task for single, staged and two-up drivers differed in several important ways. Although the groups differed on some operational characteristics, they

can still be compared on the basis of what constitutes a day of work for long distance drivers, namely in terms of characteristics of trips such as duration and length. Two-up drivers covered by far the greatest distances, and their trips involved the longest hours, in fact their trips typically lasted more than one 24 hour period. They also had longer weekly working hours and had less frequent but longer breaks. Staged drivers did by far the shortest trips, taking short breaks during the trip rather than long ones. They also worked shorter weekly hours. Single drivers did trips of intermediate length, and, on average, trips of similar duration to two-up drivers. Single drivers, however, reported a completely different distribution of trip length to two-up drivers, most doing trips of intermediate length. The distribution was clearly influenced by the fact that this group consisted of drivers doing tour work and drivers doing express work. The former covered long distances over a long period of time, while the latter covered shorter distances over shorter periods of time. Single drivers, like staged drivers, were more likely to work shorter weekly hours.

There were other differences in the patterns of work described by drivers involved in each of the different operations. Single drivers were less likely to start their trips during the early hours of the morning than staged or two-up drivers, and were also less likely to report overnight trips in the previous week. Staged drivers were the most likely to have done long distance trips in the previous week.

These differences in the patterns of work for the different driving operations appeared to influence the experience of fatigue. Overall, single drivers fared better than either two-up or staged drivers, reporting the lowest levels of fatigue on the last trip. This advantage of single driving remained irrespective of whether the drivers were involved in tour or express work. Two-up

drivers were the highest reporters of fatigue on the last trip, and yet, despite this, and the quite obvious pressures of their very long trips, most two-up drivers did not consider that fatigue was a problem for them. This was also found for the freight sector and again may well reflect the need for two-up drivers to become accustomed to the rigours of their very long trips.

Staged drivers, however, just as in the freight sector, reported fatigue as much more of a problem for them overall than either single or two-up drivers. The short trips that these drivers do clearly does not fully offset other factors in their work that cause accumulated fatigue such as doing more long distance trips in the previous week, more night work, having shorter breaks during the trip and breaks for work reasons rather than rest.

A major part of the questionnaire was devoted to current and potential fatigue management strategies and their usefulness. Irrespective of the part of the bus and coach sector from which the driver came, coach drivers reported that they currently use a range of fatigue management strategies which are temporary measures to alleviate the symptoms of fatigue. These strategies included activities such as using the radio or listening to music, having a drink containing caffeine and the like. The use of permanent solutions to fatigue, sleeping or resting, was virtually nonexistent. In contrast, most truck drivers reported that sleep and rest were among the most common and favoured ways of dealing with fatigue currently. Yet, the experience of fatigue was impressively consistent across the industry. It seems that how and when fatigue is experienced and how it affects performance of the driving task are all very predictable and are more influenced by biological factors on drivers than by operating characteristics. The choice of strategy for dealing with fatigue, on the other hand is likely to be very strongly associated with operational constraints. It is likely that

bus and coach drivers use the best measures that they have available. Operationally, coach drivers are not as free as truck drivers to stop for rest or sleep on a needs basis because of the demands to keep passenger schedules on time. Many truck drivers were able to influence the scheduling of their own trips to greater and lesser degrees, whereas virtually all coach drivers have their work scheduled for them.

The use of stay awake drugs was also virtually absent in the strategies reported by bus and coach drivers as current ways of managing driver fatigue. In contrast, a significant minority of truck drivers reported that they found stay awake drugs helpful for managing fatigue at least occasionally. The virtual absence of stay awake drugs in the bus and coach sector is probably due to the public liability responsibilities of coach drivers, and to the fact that passengers are likely to detect the use of drugs.

Drivers' views about the value of a range of potential management strategies for fatigue showed remarkable consistency. Improvements to roads, easing schedules and increasing flexibility of working hours were prominent among the strategies judged to be very helpful. This is consistent with those reported by truck drivers. In contrast to truck drivers, however, bus and coach drivers reported policing of drugs and staged driving as also being very helpful, with very few bus and coach drivers judging that making stay-awake drugs available by prescription would be a helpful strategy for reducing fatigue.

Bus and coach drivers' views of staged and two-up driving as work practices to manage driver fatigue were very similar to the views expressed by truck drivers. Overall, two-up driving was preferred by relatively few drivers. Those who preferred two-up were drivers who either were

currently doing it or who had fairly recent experience of it, while drivers with past experience of two-up driving rated it as more fatiguing than single operations. This suggests that two-up drivers are a self-selected group. Staged driving, on the other hand, was judged favourably against single operations by most coach drivers, particularly if they had recent experience of it. Thus, despite the high reporting of fatigue associated with it, staged driving clearly has some desirable characteristics in the view of drivers.

The present study completes the first stage of this project. Stage one was designed to canvas industry's views about the most effective and practicable ways of better managing driver fatigue in the long distance road transport industry. Taken together, the results of the present report and the earlier report suggest that the most successful strategies for reducing fatigue include improving roads, easing tight schedules, shorter trips and greater flexibility to arrange trips and, for a selected group of drivers, staged and two-up operations. A striking feature of the findings of the two surveys was the similarity of the patterns of work described by drivers from the freight and the passenger sectors doing two-up and staged operations. Overall, the results of Stage 1 raise questions about the usefulness of staged and two-up operations as fatigue reducing strategies, despite the provision of a relief driver.

Stage 2 will specifically take up the issues raised in Stage 1. Flexible hours and the impact of staged and two-up driving will be evaluated to determine to what extent they are useful, how they could be improved and how the improvements could best fit into the industry operationally.

SUMMARY OF MAIN FINDINGS

CHARACTERISTICS OF THE SAMPLE

- * Two hundred and fifty drivers from all states and territories except Tasmania and the ACT participated in the survey.
- * All except one driver were male.
- * Most (80 %) of the drivers worked for large companies with more than fifty vehicles.
- * Express drivers constituted 72 % of the sample and tour drivers 28 %.
- * Sixty-six percent of the drivers surveyed drove in single driver operations, 18 % drove two-up operations and 16 % drove staged operations.

CHARACTERISTICS OF THE DRIVERS

- * The mean age of drivers was 40 years.
- * The majority of the drivers were married or living in a defacto arrangement. Fewer two-up drivers were married than staged and single drivers.
- * More single and staged drivers had children than two-up drivers but the average number of children was constant across all groups.
- * The majority of express (63 %) and tour (70 %) drivers were paid an hourly rate as were the majority of single (67 %), two-up (61 %) and staged (61 %) drivers.

- * A significant proportion of single (26 %) and staged (31 %) drivers were paid weekly and a significant proportion of two-up drivers (14 %) were paid per km.
- * The majority of express (85 %) and tour (87 %) drivers were paid at the award. Around 90 % of single and staged drivers were also paid the award, but only 66 % of two-up drivers were paid the award.

CHARACTERISTICS OF THE LAST TRIP

Length and duration

- * The mean trip distance for all drivers was 2200 km (standard deviation (s.d.) = 2528 km).
- * 43 % of drivers covered less than 700 km on their last trip and 31 % more than 1500 km.
- * Tour drivers covered much longer distances on their last trip than express drivers (3000 vs 1500 km).
- * Two-up drivers covered much longer distances on their last trip than single and staged drivers (4100, 1000 and 1300 km respectively).
- * The mean duration of trips was 78 hours (s.d. = 111.4 hr).
- * 75 % of drivers worked more than 12 hours on their last trip and 35 % equal to or more than 30 hours.
- * Express drivers' mean trip duration was much shorter than tour drivers' (28 vs 129 hours).
- * Two-up drivers were the most likely drivers to complete very long trips with 75 % of them completing trips longer than 30 hr duration compared

with 30 % of single drivers and 12 % of staged drivers.

Scheduling

- * Virtually all drivers had their trip scheduled by someone other than themselves.
- * The majority of drivers started their trips between 6 am and 6 pm (71 %).
- * Express drivers were far more likely to start work between 6 pm and midnight than tour drivers (20 % compared to 1.4 %).
- * Staged drivers were much more likely to commence their trips at night (43 %) than single (27 %) or two-up (24 %) drivers.
- * The vast majority (84 %) of drivers across all groups reported travelling at or below the speed limit.

Breaks

- * Tour drivers spent a greater proportion (32 %) of their trip time in breaks than express drivers (23 %).
- * Single, two-up and staged drivers spent 25, 29 and 27 % of their trip time in breaks respectively.
- * Most breaks for all driver groups involved some work.

Other activities

- * The majority (87 %) of drivers were involved in other work related activities besides driving.

- * Express drivers spent much less time (10 % of trip time) on other work-related activities than tour drivers (22 %).
- * Single drivers spent a greater proportion of their trip involved in other work-related activities (17 %) than staged (11 %) and two-up (6 %) drivers.

Breaking the rules

- * About 20 % of drivers reported breaking the work hour regulations on half or more of their trips.
- * Less than 15 % of drivers in all groups reported breaking the road rules on half or more of their trips.
- * Breakdowns, late service connections, passenger problems and tight schedules were the most common reasons cited by all drivers for breaking the work hour regulations and the road rules.

CHARACTERISTICS OF THE LAST WEEK

- * More express drivers (85 %) than tour drivers (47 %) completed long distance trips in the last week.
- * Staged drivers (100 %) were more likely to complete long distance trips in the last week than two-up (87 %) drivers and single drivers (64 %).
- * More tour drivers (43 %) worked less than 38 hr in the last week than express drivers (15 %).
- * Two-up drivers worked approximately one and a half times as many hours in the last week as single and staged drivers.

- * Many more two-up drivers worked greater than 72 hours in the last week (58 % compared to less than 5 % of single and staged drivers).
- * Express drivers worked more nights in the last week than tour drivers (3.6 compared to 1.7).
- * Two-up and staged drivers worked an average of four nights in the last week which was more than single drivers who worked an average of 2.5 nights.

FATIGUE

Size of the problem

- * The majority (58 %) of all drivers thought that fatigue was at least a substantial *industry* problem.
- * Only 18 % of drivers thought that fatigue was at least a substantial *personal* problem.
- * Fewer tour drivers than express drivers thought that fatigue was at least a substantial *personal* problem (12 % compared to 21 %).
- * Far more staged drivers (51 %) than two-up (7 %) and single (14 %) drivers said that fatigue was at least a substantial *personal* problem.

Experience of fatigue

- * More express drivers (17 %) than tour drivers (12 %) reported feeling fatigued on more than half their trips.
- * More staged drivers (26 %) than two-up (17 %) and single (14 %) drivers reported feeling fatigued on more than half their trips.

- * Express and tour drivers reported feeling fatigue around eight hours after starting work.
- * Two-up drivers reported feeling fatigued around 12 hours after starting work which was approximately double the time reported by single and staged drivers.
- * Express drivers identified the hours between midnight and 6 am as that time period when they were most likely to feel fatigued, in contrast to tour drivers who reported the hours of midday to 6 pm.
- * Around 60 % of staged and two-up drivers reported feeling fatigued between midnight and 6 am which was almost double the percentage of single drivers reporting those hours as the time period when they were most likely to feel fatigued.

Effects of fatigue

- * The majority (63 %) of all drivers thought that fatigue had an adverse effect on their driving.
- * The most commonly cited adverse effects of fatigue on driving were:
 - slower reactions
 - poorer gear changing and
 - poorer attention to traffic signs.

Contributors to fatigue

- * Both tour and express drivers nominated inadequate sleep before trips and long driving hours as the most important contributors to fatigue.
- * Tour drivers also nominated monotonous driving routes as another important contributor to fatigue

whilst express drivers also nominated dawn driving and poor bus rest facilities.

- * Single and staged drivers tended to nominate external conditions such as the road, weather and time of day as the most common contributors to fatigue whilst two-up drivers nominated poor bus facilities and insufficient rest breaks.
- * In the main, there were no major differences between any of the driver groups in the fatigue management strategies they currently implemented and regarded as helpful; all driver groups implemented temporary measures to alleviate the symptoms of fatigue.
- * None of the driver groups except staged drivers nominated rest or sleep as the most commonly used or most helpful fatigue management strategies.
- * All driver groups thought improvements to the roads would be of major benefit in reducing their fatigue and most groups thought industry self-regulation would also be helpful.
- * Express, staged and single drivers also nominated staged driving as a potentially helpful strategy whilst two-up drivers nominated two-up driving.
- * All driver groups also thought that easing schedules would be the amongst most helpful strategies to reduce fatigue.

TWO-UP AND STAGED DRIVING

- * More experienced staged drivers preferred staged driving over single driving (53 %), whereas only 30 % of experienced two-up drivers preferred two-up over single driving.

- * The most common reason for preferring staged driving was better sleep quality (64 %) and for preferring two-up driving, better and less fatiguing working conditions (74 %).
- * The majority of experienced two-up drivers rated two-up as more fatiguing than single driving, whereas very few experienced staged drivers rated staged driving as more fatiguing than single driving.
- * Most staged drivers (72 %) thought that single and staged driving were equally fatiguing.
- * The majority of drivers with experience of two-up (54 %) thought it was more fatiguing than single driving.
- * The most common reason (72 %) for finding two-up more fatiguing was poorer sleep quality.
- * The more recent or current the experience drivers have of two-up driving, the more likely they are to prefer it and to find it less fatiguing.

BACKGROUND

This study forms the second part of a survey of the long distance transport industry, focusing on current work practices and drivers' attitudes to both on the job fatigue and to the best ways of managing it. The first part of the survey involved long distance truck drivers and was the subject of a report published by the Federal Office of Road Safety (FORS) in May 1992 (Williamson, Feyer, Coumarelos and Jenkins, 1992). The second part of the survey will concentrate on the long distance bus and coach sector of the industry.

The study arose out of the considerable concern about the issue of driver fatigue over the past few years from a number of sectors of the long distance road transport industry. As found in the first part of the survey, there is agreement from most industry groups that fatigue is a problem in the industry, and that it is a major problem. In line with this view, there have been a number of working parties and committees set up to suggest ways of solving the problem. For example, the Road Transport Forum's Working Hours committee and the Australian Transport Industry Council's Special Task Group on Working Hours.

Most of the solutions advanced to overcome driver fatigue have concentrated on working hours. In this study there has been an attempt to broaden the scope of possibilities for solving the problem of fatigue to include a range of work practices. This is being done in two stages. The first stage involves surveys of the two major sectors of the long distance road transport industry, the truck or freight-carrying sector and the bus and coach or passenger-transport sector. The results of the surveys of driver attitudes to fatigue and its solutions will form the background to the second stage of the study. In the second stage the work practices will be selected that are

most likely to be successful in reducing driver fatigue based on previous research findings and on the judgements of drivers and the industry as found in stage one. The utility of these work practices will then be evaluated on the road.

The need to survey the bus and coach sector of the road transport industry originated in the view that this is a substantial sector of the industry which differs from the trucking sector in a number of important ways. Therefore any consideration of fatigue in the road transport industry must include the bus and coach sector. In addition, attention was drawn to the issue of bus operator fatigue due to two serious crashes involving buses over the past 12 to 18 months.

The section of the study reported here is a replication of the survey of truck drivers. It will ask the same questions of long distance bus and coach drivers as were asked of truck drivers. This will allow direct comparison of the views of the two groups about fatigue and how it might be managed. It will also allow comparison of the current work practices of the two groups and provide some insights into the influence of the different pressures on drivers in each sector.

INTRODUCTION

The task of driving requires the driver to maintain alertness and attention over prolonged periods. Consequently fatigue is a potential problem for most drivers becoming more likely as trips get longer. The effects of increasing fatigue on driving performance are well-recognised (McDonald, 1984). Considerable evidence exists to show that performance deteriorates with increasing time on the job, particularly when the job is monotonous as is the case for the driving task (Davies, Shackleton and Parasuraman, 1983). Driver errors increase with increasing driving time and performance deterioration can show up as early as 3 hours into the trip (Harris and Mackie, 1972). Furthermore, there is evidence that accident risk also increases with driving time (McDonald, 1981).

The performance effect of fatigue on driving can be modified by a number of factors such as duration of the trip, time of day, the number of trips done in succession and the distribution of rest periods throughout the trip. Many of these factors were reviewed in the previous report of our survey on truck drivers and will not be reviewed again here. Undoubtedly many of these factors will have similar effects on bus and coach drivers as truck drivers. Coach drivers however do experience a number of factors and conditions which may cause them to respond differently to long driving and working hours compared to truck drivers.

Even though the driving task is fundamentally the same for truck and coach drivers, the task of coach driving, on the face of it, appears to be less demanding. There are a number of reasons for making this conclusion, most of which are due to the fact that coach drivers carry people rather than freight. First, coach drivers experience less pressure to keep driving than truck

drivers since they need to take breaks for the passengers they carry. Second, the start and finish times for coach drivers are unlikely to be very early in the morning or very late at night again because of the requirements of passengers. Finally, for many coach drivers, the job is likely to be done during normal waking hours. For these drivers, the "danger hours" of 2 am to 4 am will be avoided, again because of the demands of passengers.

On the other hand, there are undoubtedly some factors which might increase the fatigue problem for coach drivers. The most important of these is that coach drivers are likely to have less flexibility to drive as they would prefer than truck drivers. While they possibly take more breaks than drivers in the freight sector, drivers in the passenger sector must take their breaks at specified times, no matter how they are feeling at the time. In addition, coach drivers would appear to have schedules of departure and arrival times that are far stricter than for truck drivers since passengers expect them to be precise. It is also likely that where truck drivers tend to drive point of origin to point of destination, coach drivers have more intermediate stops and consequently more demands to keep to time. In addition, for sections of the bus and coach industry, specifically the express bus section, the job involves overnight driving, which will clearly exaggerate the fatigue they experience.

Coach drivers also have the added pressure of responsibility for passengers. Despite the fact that particular types of freight like dangerous goods and perishables require increased responsibility during the trip other than simply getting to the destination, bus and coach drivers have the additional responsibility of passenger safety and passenger needs.

Just how these characteristics of coach driving affect drivers is not clear. Whether the apparent advantages that coach drivers have over truck drivers act to protect them from fatigue or whether the negative aspects of their job counteract any advantages is not well-understood. It is also not clear to what extent the different pressures experienced by coach drivers influence their preferred ways of coping with any fatigue they experience.

There has been very little research that might resolve these issues, especially in Australia. A study by Raggatt (1991) of stress in a relatively small group of Australian coach drivers showed that coach drivers suffered adverse consequences of stress. Raggatt attributed this to the demands of driver's work environment, in particular long driving hours. These results suggest that long distance coach driving has negative consequences for the driver.

The view of the bus and coach industry is in conflict with Raggatt's findings. The industry view appears to be that the demands of the coach driving job do not lead to long hours and fatigue. This conclusion is based on the results of the truck survey in which discussions using a standard format were held with industry groups about the extent to which fatigue is a problem in the long distance transport industry and about the acceptability and effectiveness of a range of potential solutions to driver fatigue. The Australian Bus and Coach Association (ABCA) were included in these discussion groups.

The results of the discussion groups showed that overall the view of ABCA was different to all other groups from the long distance transport industry. Like two other groups, (the Livestock Transport Association and the Long Distance Road Transport Association) ABCA thought that fatigue was not a problem for coach drivers and that the

pressures on coach drivers do not promote fatigue. The views expressed by ABCA about which possible strategies might assist drivers also showed up the extent that the coach industry differed from the other industry sectors. Along with all other industry groups, ABCA endorsed better information and training about fatigue and improvements to the roads as helpful strategies for managing fatigue. Of the five other strategies endorsed by most groups as useful for managing fatigue, ABCA failed to endorse any. Thus none of the strategies, better off-road facilities, more flexible hours, staged driving, reducing economic pressures on driving, easing tight schedules and more efficient loading and unloading were seen by ABCA as helpful. The main reason provided for their views was that the area tapped by a particular strategy was not a problem for coach drivers.

Of course there are a many possible reasons why the industry view might differ from that of drivers, however there is clearly a need to determine how much fatigue coach drivers experience and whether it is a problem, how they manage it and what else they think could or should be done about it. This is the aim of this report. In addition this study will allow investigation of whether coach drivers are different from drivers in the freight sector, what factors make them different and whether there are unique needs for coach drivers in dealing with the problem of fatigue.

METHODOLOGY

DESIGN

The survey was basically modelled upon the Australian Truck driver survey to enable direct comparisons between the results of the two surveys. However, because of differences between the two transport industries and their resulting influence on driving practices and operations, a new survey was developed for this stage of the study. Like the truck survey, the bus and coach driver survey was structured so that it could be self-administered or completed by interview. The content of the survey was generally similar to that of the truck driver survey and covered four major areas: 1. the extent to which driver fatigue is a problem in the long distance bus and coach industry in Australia, 2. the effects of fatigue on driving, 3. the factors which contribute to driver fatigue and 4. attitudes to possible strategies that could be used to reduce driver fatigue. Additional questions on driver characteristics and current work practices were also asked.

After initial development, the bus and coach survey was sent out to industry representatives for comment and review. Table a in Appendix 2 details the industry contacts from whom comments were sought and their mode of response. Although there was a general consensus from industry representatives that the survey was important and necessary, there were also considerable concerns as to the content of the survey, the style of presentation of questions and the lack of differentiation between driving operations, specifically between express and tour operations. An initial revision of the questionnaire in response to these concerns was completed, however, industry representatives continued to express concerns relating to the questionnaire content and indicated a

reluctance to agree to their companies participating in the survey if it remained unrevised. After further consultation with Australian Bus and Coach Association representatives, it was decided to offer members of the Interstate Coach Operators Association (ICOA) who more specifically represented the express sector and who had greatest concerns regarding the survey, the opportunity to hold one of their regular meetings at Worksafe premises to be followed by a meeting between ICOA members and the research team. This meeting was held on July 31st 1992 at 14:00 and was attended by representatives of all the major express companies including Australian Coachlines, McCafferties, Kirklands and Lindsays, two tour company representatives from AAT Kings and Australia Pacific Tours, Mr. Robert Hertogs, head of Toronto Bus Lines, as the ABCA representative and all four members of the research team.

At this meeting general information pertaining to the background to the survey, its aims and design was presented followed by an open discussion of industry concerns and possible solutions. A question by question review of the survey was completed with final agreement that the revised survey would be reproduced in a new format with separate fatigue and work practices sections for the express and tour sectors, and with the inclusion of several additional questions and options to questions which industry representatives felt would relieve any inbuilt biases. Final comments on a revised questionnaire were received from industry representatives on August 7th after prompting. The final version of the questionnaire is presented in Appendix 1.

As a consequence of having an opportunity to comment on, and to contribute to, the development and contents of the questionnaire, industry representatives agreed to fully participate in the study and to co-operate with the research team.

SUBJECTS

Two hundred and fifty drivers participated in the bus and coach driver survey. Eighty drivers (32%) completed the survey in interview and 170 (68%) by self-administration. All except one driver surveyed were male.

MATERIALS

The survey was sent out or delivered to companies accompanied by a reply paid pre-addressed envelope, a covering letter of explanation for drivers and an instruction page for company questionnaire distributors. Copies of these latter two information sheets are included with the questionnaire in Appendix 1.

The survey included the following definition of fatigue (at the beginning of Section 2) in order to maximize consistency in drivers' interpretation of the concept of fatigue: "By fatigue we don't only mean feeling drowsy or sleepy. We also mean being tired, lethargic, bored, unable to concentrate, unable to sustain attention and being mentally slowed." This definition was identical to that included in the truck driver survey.

The first two sections of the survey were aimed at all drivers regardless of their usual type of driving (tour versus express).

Section 1 of the survey sought general driver and vehicle information and was aimed at providing information concerning the composition of the sample. Personal details pertaining to the driver such as age, gender, marital status, number of dependents, location of home base were requested, as was information concerned with years of experience driving buses and coaches, years driving experience in the heavy transport industry and

current employment history including years with current company, type of vehicle driven, type of trip most often completed and rates and method of payment. Company details such as the size of the company and the number of buses or coaches run were also sought.

The second section of the survey was a general section on fatigue aimed at obtaining information about drivers' experience of fatigue and their attitudes to fatigue and to potential combating measures. Specifically, questions seeking drivers' opinions of how big a problem fatigue posed for the long distance bus and coach industry in general and for themselves personally were asked.

Drivers were then questioned as to their experience of the effects of fatigue on driving (if any) and perceived contributors to driving fatigue. Drivers were asked to rate the effectiveness of a list of strategies suggested as possibly being useful in reducing driver fatigue. Drivers were also given the option to list any other strategies which they felt might be useful in reducing or dealing with driver fatigue.

Section three requested information from express drivers concerning their last trip. This section was duplicated later in the questionnaire for tour drivers so that express and tour drivers could complete the same questions in distinct sections. The purpose of this section was to obtain accurate information from the drivers concerning their work which would thus permit examination of the occurrence of fatigue in relation to the wider circumstances of driving. Drivers were asked general questions about their last long distance (defined as greater than 300 km) trip. Questions included the duration of the trip, starting and finishing points and time, timetabling, type of driver operation, rest breaks, other work duties completed and average driving speed. Information concerning breaks from driving and the reason for such breaks together with information related to

activities completed in the ten hours prior to the last trip was also sought. Finally, in this section drivers were asked whether they had experienced any fatigue on their last trip and if so when it occurred, how often on this trip and at work generally, and how long after starting work. Drivers were then requested to indicate which of a long list of factors contributed to their fatigue and which factors were most likely to result in them experiencing fatigue. The last question in this section asked drivers to indicate how often they implemented a list of strategies to reduce driver fatigue.

In the tour driver duplication of this section questions concerning hours worked and driven, kilometres travelled and breaks taken were asked in relation to the shortest, longest and a typical day of the last tour. In the analysis, only the typical/longest day breaks table was examined because most tour drivers failed to fill out the shortest driving day breaks table as on that day they often did not drive or only drove a very short distance.

Section four attempted to gauge whether the trip drivers described was typical of the usual trip they completed. This section was also duplicated later in the survey. This section asked drivers to indicate whether their last trip differed from their usual trip and if so how in the context of hours worked, breaks taken, distance driven and mode of operation (ie. tour versus express). Section five sought information about the previous working week of drivers and also attempted to establish whether the trip just described matched with the type and style of work drivers completed in a normal working week. In addition to questions pertaining to hours, trips and time spent away from home base, drivers were also asked whether they completed any overnight driving stints and any long distance trips in the week preceding the trip just completed. This section was also duplicated later

in the questionnaire for tour drivers with appropriate alterations, namely tour drivers were also asked to indicate how many hours they spent working, driving and resting/sleeping for each of the seven days of the week preceding their last tour.

Sections six and seven of the survey were aimed at obtaining the opinions of drivers who had in the past or were currently driving two-up or staged operations respectively. Drivers were asked to indicate which mode of driving operation they preferred and why, how often they had driven each respective mode of operation and how recently. Information related to typical two-up and staged driving operation trips was requested as were drivers' experiences of fatigue and factors which might contribute to, or reduce any fatigue experienced whilst driving in two-up or staged operations.

Section eight was entitled the breaking rules section and was for all drivers to complete. This section aimed to discern whether drivers knew the work hour regulations that applied to their job, if they broke those regulations and if so how often, and the reasons behind any such violations. Information as to the frequency with which drivers drove contrary to the road rules and the reasons for any such infringements were also sought.

At the end of the questionnaire drivers were given the opportunity to make any comments they desired concerning the long distance bus and coach industry. If these comments contained suggestions as to ways in which driver fatigue could be managed in the long distance bus and coach industry, these suggestions were coded in accordance with the suggested strategies for combating fatigue in section two.

PROCEDURE

Difficulties were encountered in establishing what the distribution of bus and coach companies and drivers looked like Australia wide. There was a lack of comprehensive information concerning the general make-up of the industry - what proportion of the industry operated in the express sector and what proportion in the tour sector - and uniform state and territory information was also lacking. Information was sought from ABCA concerning the number and type of long distance bus and coach drivers Australia wide. On their advice, individual state and territory Bus and Coach Associations were approached with requests for membership lists as this was thought to be the most likely means of gaining reasonably up-to-date information. The response to this request varied across the country; NSW (which included the ACT), South Australia, Queensland and the Northern Territory responded with complete and membership lists although the details contained in these and their currency varied greatly. **The South Australia Department of Transport** also supplied their list of current licensing details which contained information concerning the major type of work done by each licensee. The Victorian BCA responded with a detailed description of their membership and licensing profile divided according to number of coaches and members. This table (table b) is displayed in Appendix 2 as it demonstrates clearly the dichotomy between the number of one bus companies with one member and one licence, and the number of large companies with numerous licences issued to that company. Western Australia refused to comply with the request on the grounds that it violated membership confidentiality. The Tasmanian Bus and Coach Association was also approached but as there were only two long distance operators in Tasmania and as their most common driving

routes did not exceed 300 km on most trips, Tasmania was excluded from further sampling.

Membership lists were, in the most part, comprehensive. However, not all bus and coach drivers or companies were members of state or national organizations and thus membership lists were augmented with information gleaned from telephone books. In the case of Western Australia, information gained from the telephone book was the only information available on which to base sampling strategies and thus resulted in only companies based in Perth being approached to participate in the survey.

It was intended that the study sample would be representative of the distribution of bus and coach drivers Australia wide. However, one major complicating factor which made this approach inappropriate was highlighted by the Victorian list and was confirmed after other membership lists had been perused. Although the vast majority of bus and coach drivers Australia wide are single owner-driver operations, these individuals predominantly complete school bus routes, community work and/or occasional charter work. Most therefore did not fall within the predefined long distance trip criteria and were not suitable subjects for the study. A decision was made to contact a small number of these drivers in each state in order to confirm that this was the case and if so to proceed on the assumption that most long distance bus and coach drivers would be employed by small to large companies with more than one vehicle. Telephone contact with a number of owner-drivers from Victoria, New South Wales, South Australia and the Northern Territory confirmed this hypothesis; most of these individuals did not complete long distance trips and if they did, did so only very occasionally and usually as charter work for their local community. A small number of surveys (three) were sent out to individuals who regularly drove long distances as a result of this contact. Subsequent sampling efforts concentrated on the medium to large

companies who, whilst representing a smaller percentage of bus and coach drivers overall, actually employed the majority of long distance drivers.

Sampling

Actual sampling varied from state to state.

1. **ACT.** Eight companies were listed as members of the NSW BCA under ACT and a further three companies were listed under a Coach Operators heading. These companies ranged in size from 1 to 34 buses and all companies were contacted. Most of the companies contacted were in fact local companies who did very occasional long distance charter work and thus did not fall within the criteria of the survey. The remaining companies, including one large long distance express operator, all refused to participate in the survey.

2. **New South Wales** The BCA membership list for NSW was comprehensive containing 1070 members with contact details and information as to the number of buses each member had. The membership list was divided into 22 sections, mainly pertaining to geographical areas within NSW and the size of companies within those sections ranged considerably from 1- 89 buses. Due to resource limitations, it was impossible to contact all companies within NSW. A decision was therefore made to concentrate on specific areas within NSW and these consisted of the metropolitan area, Newcastle and Northern, Central and Coastal NSW. All companies running more than 5 coaches within these areas were contacted and all coach operators listed in that section were also contacted. About 75 % of the companies contacted in the metropolitan area predominantly drove commuter routes and did not do any long distance work. Around two thirds of the country companies contacted predominantly drove school bus routes and thus also did not meet the inclusion criteria. In

total, four express companies, employing from 5 to 100 drivers, and 16 tour companies employing from 5 to 60 drivers agreed to participate in the survey. These companies were from all areas selected although the larger companies were based in or close to Sydney whilst the smaller companies were country based.

3. Victoria Victorian companies were also sampled on the basis of size and geographical location. No specific information concerning the main type of driving done by companies was available from the membership list. Therefore, all companies with more than 50 buses (12 companies) were contacted and 1 in 5 companies (28 companies) with between 5 to 50 buses were contacted within the Melbourne metropolitan area. Once again, the majority of small to medium sized companies completed only community and school bus routes and thus were excluded from the study. In total, two express companies employing between 50 - 200 drivers and 124 tour companies employing between 5 and 100 drivers agreed to participate in the survey. These companies were all Melbourne based.

4. Queensland Ninety-five companies were listed in the QLD BCA list. From the list details, the main type of driving completed was fairly obvious and all charter and school bus companies were excluded (34 companies). Companies in the Brisbane metropolitan area and in Cairns and Toowoomba were then targeted. One in 5 (13 companies) of these remaining tour and express companies with more than 5 buses were sampled. Final sampling resulted in 2 express companies employing between 100 and 200 drivers and 6 tour companies employing between 5 and 40 drivers participating in the survey.

5. South Australia From the BCA membership list, it became obvious that approximately one in two registered members drove predominantly school bus and charter work. These companies were not included and further sampling

concentrated upon the Adelaide metropolitan area where one express company employing up to 100 drivers and 5 tour companies employing between 5 and 30 drivers agreed to participate in the survey (of thirteen companies contacted). Further sampling in South Australia was made extremely difficult due to the lack of contact numbers and addresses on the BCA list and because of a lack of correlation between the companies listed as members of the BCA and those listed on the Department of Transport licensee file.

6. Western Australia As mentioned previously, no membership list was available for this state. Company contact was therefore restricted to the Perth metropolitan area where contact numbers and addresses could be gleaned from the telephone book. As a result of this effort, 1 express company and 6 tour companies agreed to participate in the survey. **These companies** employed between 5 and 50 drivers.

7. Northern Territory The BCA list for the Northern Territory contained 18 companies who were mainly located around Alice Springs and Darwin. The majority of these companies were tour companies employing between 5 and 40 drivers. All tour companies in the Alice Springs and Darwin areas were contacted and 8, 4 in each location, agreed to participate in the survey.

Companies were initially contacted by telephone and permission to approach drivers sought from the general manager. The rate of agreement tended to be somewhat variable with many companies sceptical as to the relevance of the survey to them and their drivers and also concerned as to the possibility of adverse publicity resulting from the study. In total, 144 companies were contacted. As detailed in the previous paragraphs, sampling was constrained by the extent and quality of information available to us and by resource limitations.

approached directly, although the vast majority of drivers who were approached agreed to participate. In total, of the 1200 distributed, 250 completed questionnaires were received from drivers from 24 companies. The response rate from company to company varied considerably (from 0 to 100 %) with smaller companies overall having a higher response rate. Tour companies tended to have a higher overall questionnaire return rate than express companies and companies who readily agreed to interviews also tended to have a higher response rate.

The time spent at the Roma Street Transit Centre in Brisbane proved to be the most productive in terms of improving the questionnaire return rate. Over three days, every long distance bus and coach driver returning to or leaving from this depot was approached and asked if they had heard about the survey and/or had completed a questionnaire. Approximately one third of the drivers approached had been given the survey by their companies and had yet to fill it out. They were actively encouraged to do so and drivers who had already completed the questionnaire were thanked and were asked to encourage their co-workers to do the same.

Questionnaires were given to all the rest of the drivers approached (63 in total with only two refusals) and forty of these were returned. This response rate shows the success of approaching drivers personally.

Unfortunately, the resources of the study and other practical constraints restricted the extent to which this method could be used.

Following the Roma Street visit, a further influx of questionnaires, particularly from Queensland based drivers, occurred so that the overall return rate was 20.8 %. One hundred and seventy of the two hundred and fifty questionnaires were completed through self administration and eighty via interview.

ANALYSIS

As this is a descriptive study of operational practice in the long distance bus and coach sector, no statistical analysis has been undertaken. Rather, prominent patterns of findings have been highlighted. To facilitate interpretation of the data, subgroup sample sizes have been included as appropriate. **Analysis of particular findings** will be undertaken for separate published reports.