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PROJECT REPORT

ATTITUDES TOWARDS SAFETY IN THE NEW ZEALAND FOREST INDUSTRY 1994

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ATTITUDES TOWARDS SAFETY IN THE NEW ZEALAND FOREST INDUSTRY

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

In the months of June and July 1993, 465 people from six companies were interviewed using a standard questionnaire to assess their attitudes towards safety. The sample was comprised of 22 managers, 28 supervisors, 59 contractors, and 356 workers from both logging and forestry.

For both the logging and forestry workers, 16% of the workforce reported having a lost-time accident in 1992. Turnover between crews was high, with over 50% of workers being in their current crew for less than two years. The median work experience was six years for logging and three years for forestry. Half the work force had passed FIRS modules.

Attitudes towards protective equipment were positive although a number of workers were unaware of the benefits of more recently developed equipment, such as spiked boots and high visibility clothing. All contractors were aware of the Health and Safety in Employment Act (1992), however only 57% had a crew safety policy. Many workers were not aware of the HSE Act or safety polices.

The majority of people surveyed agreed logging and forestry was dangerous, but few were aware of the number of people killed or injured in the industry during 1992. Although the majority of companies had set safety goals, most people were unaware of the exact goal, or how their progress towards the goal was being monitored.

While attitudes towards responsibility were good, there is room for improvement in peoples' attitudes towards safety arrangements and the handling of safety. There is a perceived lack of commitment to safety in the forest and logging industry, only 27% of managers and 14% of supervisors thought that the workforce would believe that the company was committed to safety.

Accident investigations and follow-up procedures are failing to prevent the same kind of accident re-occurring. Accidents are still being attributed to a lack of attention and carelessness. In doing this, the industry is accepting the hazards and blaming the worker. A more professional approach to accident investigations based on modern theories of injury causation need to be implemented.

Due to the hazardous nature of forestry and logging, the forest industry needs to be a leader in the field of safety. Training should be focused at all levels in the industry, not just the workers. Some of the hazards are created through decisions by senior management. Unless current attitudes change, there will be no major improvement in safety.

1 - INTRODUCTION

Both internationally and in New Zealand, logging is recognised as a very hazardous occupation with high injury frequency rates (Crowe, 1986; Pettersson 1981; Forestry and Wood Industries Committee, 1991). In New Zealand, Gaskin (1988) reported a fatality rate in logging of 2.3 per 1000 workers per year for the period 1968 through to 1987. This is 33 times higher than the national average fatality rate of 0.07 per 1000 workers. The logging fatality rate has not changed in recent years. In the 1992/93 financial year, the Occupational Safety and Health Service of the Department of Labour (OSH) reported that 11 people had been killed in logging accidents in New Zealand. The fatality rate in forestry is much lower than logging, but is still twice the national average (Cryer and Fleming, 1987).

Associated with the high fatality rate is a large number of serious accidents resulting in lost time injuries. Parker (1993a) stated that 197 logging lost time accidents were recorded by the Logging Industry Accident Reporting Scheme in 1992. The average lost-time per accident was 10.4 days. Gaskin, Smith and Wilson (1989) reported an average of 17.1 work days lost per accident, indicating the severe nature of injuries. The cost of these injuries is very high; eight million dollars was spent on forestry claims by the Accident Compensation Corporation (ACC) in 1992. The costs to companies, contractors and the workers is unknown.

It is generally believed that human behaviour is a contributing cause in 95% of all accidents. Despite this high figure, there has been little research, either in New Zealand or overseas, that examines the psychological aspects of forestry and logging work, or the psychological characteristics of the work-force (Slappendel, Laird, Kawachi, Marshall and Cryer, 1993).

The Logging Industry Research Organisation (LIRO) has conducted research into some psychological characteristics such as job satisfaction (Wilson, Gaskin and Smith, 1988) and risk perception (Tapp, Gaskin, and Wallace, 1990; Parker, 1991). Research on risk perception suggests that some accidents occur because workers underestimate the risk involved with some aspects of their jobs (Dunn, 1972). Tapp *et al.* (1990) reported that New Zealand loggers knew which aspects of their jobs were most dangerous and what part of their body was most likely to be injured. This left the question, "why then were the risks not avoided?"

An answer to this question may be found by examining the psychological attitudes of the personnel that work in the forest and logging industry. Attitudes are our evaluations of objects or entities. Attitudes comprise of cognitive (thoughts), affective (feelings), and behavioural components, which together affect the way we behave. Attitudes have been extensively studied in the field of social psychology resulting in many interesting findings. This includes knowledge on how attitudes are formed, how they can be changed, and how attitudes influence behaviour.

Attitudes are not very good predictors of behaviour. However, understanding attitudes provides information that may be used to help modify behaviour. Other industries have studied attitudes towards safety with the results being used in a wide variety of areas. These include:

- redesigning and increasing the use of protective equipment

- implementing successful safety programmes
- understanding the safety climate of an organisation
- identifying individuals at higher risk of work-related accidents.

To gain the benefits mentioned above, LIRO instigated a project in March 1993 to investigate the attitudes of forest industry personnel towards safety. For this project, the framework provided by Purdham (1984, cited in Cox & Cox, 1991) was followed. Purdham divided attitudes towards safety into four areas:

- safety hardware (protective equipment and work environment)
- safety software (safety policies and concepts)
- risk
- people.

Following discussions with various company personnel, LIRO, and Massey University, the following project objectives were proposed.

1.1 PROJECT OBJECTIVES

(1) Evaluate the attitudes of individuals involved in the New Zealand forest industry (managers, supervisors, contractors and workers) towards the four areas of safety (safety hardware, safety software, people and risk).

(2) Describe the relationship between demographic data (age, training, experience, education) and safety attitudes.

(3) Determine the current level of understanding of the Health and Safety in Employment Act (1992) at the time of the survey.

(4) Examine attitudes towards accident investigations and how recent accident involvement affects attitudes.

This report summarises the data collected during this project. Chapter 2 briefly describes the questionnaire design, data collection and sampling procedures, and the analytic strategy. The general characteristics of the sample are described in Chapter 3. Presented in Chapter 4 are the attitudes towards safety held by the logging and forestry work-force and company personnel. This is followed by a description of attitudes towards accidents and investigations in Chapter 5. The final chapter presents the conclusions from the study and recommendations to improve attitudes, and ultimately, reduce accidents.

2 - METHOD

2.1 - QUESTIONNAIRE DESIGN

A survey using self-administered questionnaires was considered the most appropriate strategy for measuring the safety attitudes of members of the forest and logging industry. This strategy was chosen due to the potential for a high response rate, the opportunity to explain in person the purpose of the study, as well as establish rapport, offer help, correct misunderstandings, and ensure questionnaires are completed correctly (Oppenheim, 1992). There was also the added advantage of being able to observe behaviour that may give a greater insight into the participant's safety attitudes. Finally, if confidentiality is stressed, socially desirable responses (people saying what they think you want to hear) should be lower when subjects are filling in a questionnaire themselves when compared to personal interviews.

A questionnaire was developed covering demographic data, attitudes towards protective equipment, the work environment, people and their perceptions of the attitudes held by other personnel, knowledge of safety policies and risk, plus attitudes towards accident investigations. Respondents answered on a 5-point Likert scale with scale anchors: strongly disagree, disagree, uncertain, agree and strongly agree. Other anchors were used when appropriate, such as the helpfulness of protective equipment scale.

Each participating group - managers, supervisors, contractors, and workers - completed modifications of the questionnaire. Managers and supervisors questionnaires had additional questions on company safety procedures. Questions were adjusted to the respondent, the worker would be asked how often does the boss talks to them about safety. The boss would be asked how often do they talk to the workers about safety. There was also a distinction made between logging and forestry.

Four logging crews and two supervisors from Tasman Forestry Limited, Taupo and Murupara regions participated in the pilot testing. The questionnaire was then adjusted and tested again. The final workers' questionnaire is attached in Appendix A, and the managers questionnaire in Appendix B.

2.2 SAMPLE SELECTION

Companies were chosen for the final survey for a variety of reasons. Forestry Corporation of New Zealand Limited (Waiotapu), Tasman Forestry Limited (Bay of Plenty District), Carter Holt Harvey Forests Limited (Kinleith Region), were selected as they represent the three largest forest companies in New Zealand. The other companies, Baigent Forests Division (Nelson), ITT Rayonier New Zealand Limited (Gisborne Branch), and Wenita Forestry Limited (Dunedin), were selected to cover a larger geographic area and to include some foreign owned companies. Copies of the questionnaire were sent to these companies for their approval. Figure 1 shows the survey area covered in the project.

Supervisors and crews were selected randomly from company lists (with the exception of one company). For the larger companies, six logging crews and four forestry crews were selected, although adjustments were made depending on the regional structure. The sample was reduced to four logging crews in the smaller companies.

At the management level, the regional Chief Executive Officer (CEO) (if present), forest manager and logging

manager were selected. It was considered important to interview all the managers due to the emphasis placed on management commitment to safety in the safety literature reviewed. The general sampling structure is presented in Figure 2. The sample is thought to be representative of each of the chosen companies and these companies represent the majority of the forest work-force.

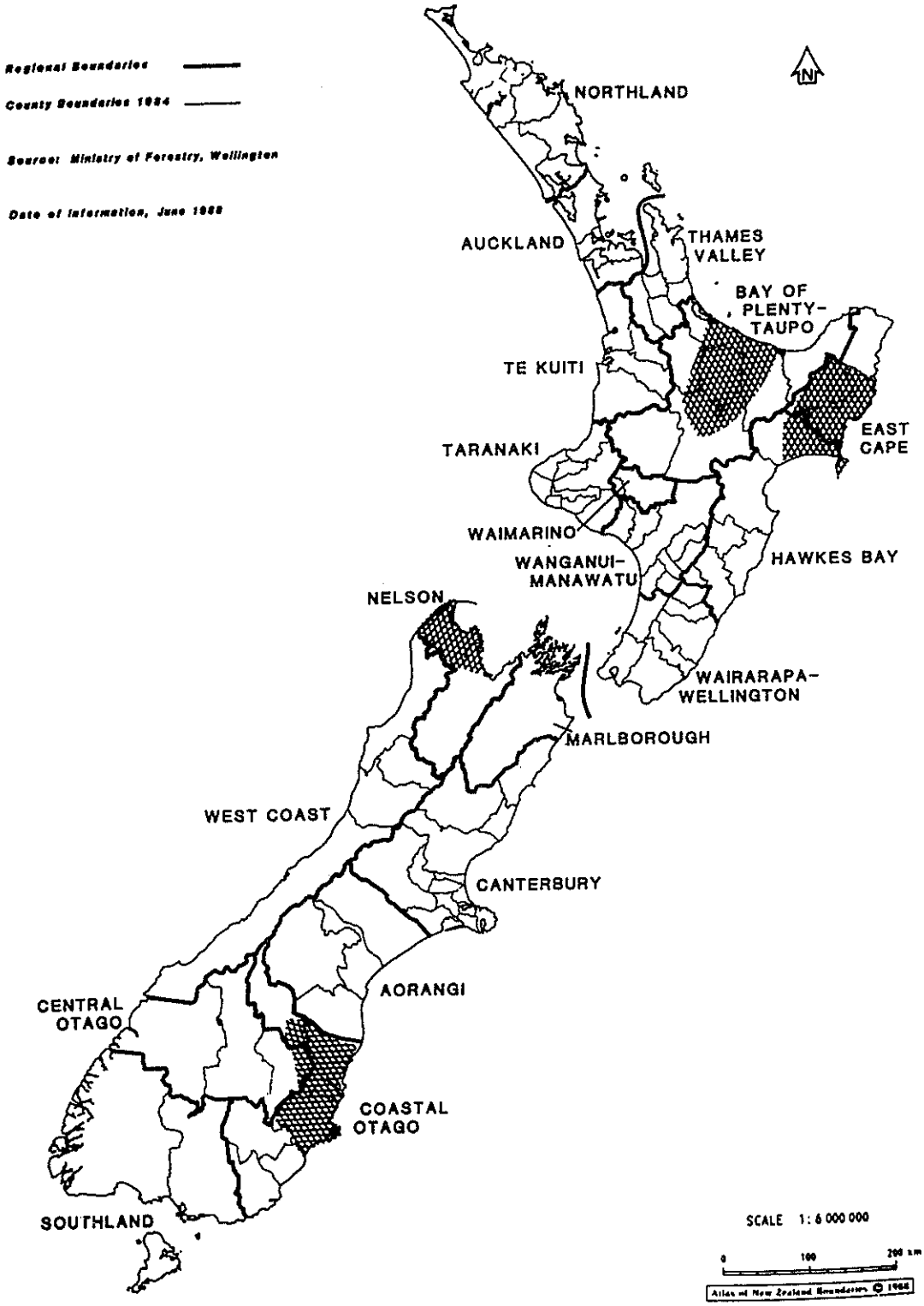


Figure 1 - Definition of survey areas

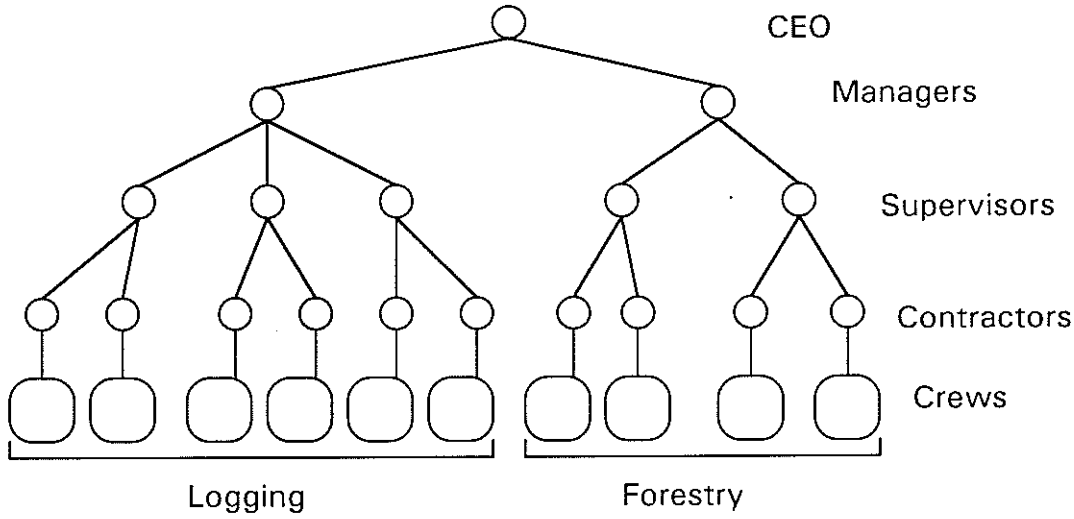


Figure 2 - Sampling structure

2.3 DATA COLLECTION PROCEDURE

Data was collected during the months of June and July 1993 from: 22 managers, 28 supervisors, 33 logging contractors, 26 forestry contractors, 195 logging workers and 161 forestry workers. Crews were personally visited on site by LIRO researchers who were trained in the administration of questionnaires. Researchers tried to keep job disruption to a minimum by surveying most crews during their rest break. The questionnaire was handed to all crew members who completed the questionnaire in their own time. The researcher(s) were available to answer any questions or queries the crews may have had. The amount of time taken to complete the questionnaire varied from 15 minutes to 1 hour with an average of 22 minutes.

The company supervisors of the selected crews were left a copy of the questionnaire to complete. A researcher went through the questionnaire with the managers (logging, forestry, and regional) to gain additional information on current safety programmes within the companies. This may have increased socially desirable responses from managers. Confidentiality was stressed and maintained in all cases.

2.4 ANALYTIC STRATEGY

The data analysis follows the practice of researchers who believe that multivariate statistical techniques can be applied to ordinal data (Kim, 1975). This technique is often used in social psychology when dealing with Likert scales. This allows variables based on Likert scales to be treated in the same way as interval scales.

A consistency check was carried out to ensure that the questionnaire was understood and completed carefully. This was done by programming a number of rules into the statistical package SPSSPC. Rules were used to alert the researcher that a questionnaire may require closer examination. For example, if a person agrees to both "It is important to wear safety equipment at all times while at work" and "I would wear the safety gear I wear now even if it was not compulsory" then they should not agree with the statement "Most of the safety gear is useless at preventing injuries". Three or more rules had to be broken to warrant further examination.

Once the data was coded and rules were checked for each case, data screening was carried out and attitude scales were then calculated. These scales were checked for

reliability through inter-item analysis and adjusted. T-tests, analysis of variance using Duncan's groupings, Spearman's correlation coefficients, and logistic regression were used to test the statistical significance of the results.

3 - GENERAL FINDINGS

3.1 SAMPLING DISTRIBUTION

One manager, two supervisors and seven workers and one manager declined to complete the questionnaire making the total number of people who agreed to participate 465 (response rate = 98%). The consistency check resulted in 14 cases being excluded from the attitude analysis, leaving 401 cases from the work-force and 50 cases from company personnel. The final sample distribution is presented in Table 1.

Table 1 - Sample Distribution

Company	Managers	Supervisors	Contractors		Workers		Total
			(For)	(Log)	(For)	(Log)	
1	3	4	5	5	11	19	47
2	3	5	4	6	31	34	83
3	7	6	4	9	29	53	108
4	4	5	3	3	14	27	56
5	2	3	3	3	19	13	43
6	3	5	6	6	49	45	114
Total	22	28	25	32	153	191	451

3.2 GENERAL CHARACTERISTICS

Age

The mean age of loggers interviewed was 31 with ages ranging from 16 to 59. This is the same as that found in the logging worker profile survey by Gaskin, Smith & Wilson (1989). Forestry had a lower mean of 25 years and ages ranged from 15 to 50 years. Figure 3 displays the percentage of the sampled work-force in each age group.

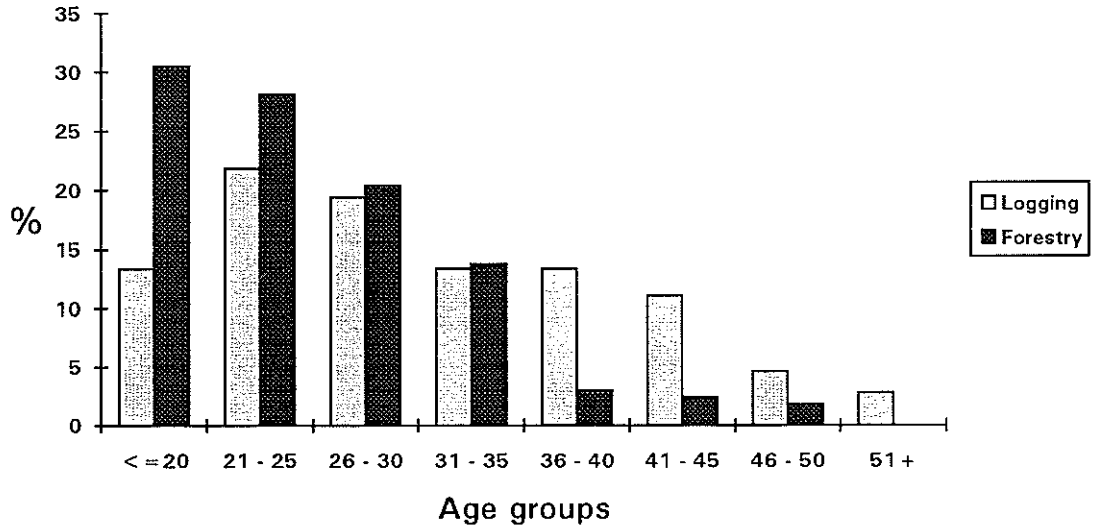


Figure 3 - Age distribution of the logging and forestry workforce

Table 2 shows the mean ages for each company with contractors and workers separated. When contractors were not on site, the foreman filled in the contractor's questionnaire. For this reason, foremen have been included among contractors. Contractors and foremen were older than the workers, with forestry having a mean age of 33 and logging 40. The mean age of company personnel was 39 years with a range of 23 to 58 years.

Table 2 - Age for each Company

Company	Managers	Supervisors	Contractors		Workers	
			(For)	(Log)	(For)	(Log)
1	43	36	34	40	23	28
2	35	40	36	40	24	30
3	48	41	38	44	21	29
4	41	40	34	44	27	32
5	42	32	32	32	24	28
6	36	29	27	38	25	29
Mean	42	37	33	40	24	29

Sex

Within the company management there were no females included in the survey. In both forestry and logging, 2% of those surveyed were female indicating that both jobs are still predominantly male.

Ethnic Origin

Figures 4 and 5 display ethnic origin for the forestry and logging work-force. Within forestry, the largest proportion of respondents were Maori (67%) followed by New Zealand European (29%). Cook Islanders, Tongans, and Samoans totalled 4%. The reverse was found in logging with New Zealand Europeans comprising 60% of the sample, Maori 38%, and Cook Islanders, Samoans and Scottish 2%. Table 3 presents these results by company. Within company personnel, NZ Europeans accounted for 88%, NZ Maori 10%, and Australians 2%.

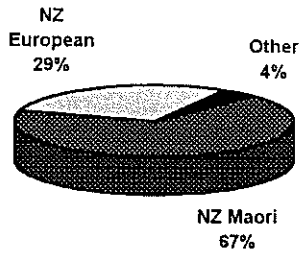


Figure 4 - Ethnic origin - forestry

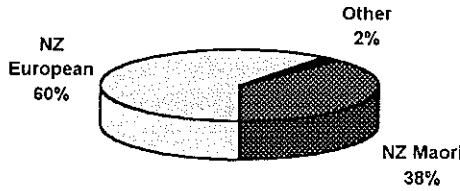


Figure 5 - Ethnic origin - logging

Table 3 - Ethnic origin - Company workforce

Company	NZ Maori	NZ European	Other
1	10	90	0
2	63	37	0
3	46	45	8
4	6	94	0
5	84	16	0
6	66	29	5

Jobs Performed

When asked which job they spent most of their time on, many workers stated they spent an equal amount of time doing a variety of jobs. For loggers, this included felling, log making, skid work, and occasionally machine operation. This form of job rotation is recommended as it helps maintain the interest in the job and relieve boredom (Parker and Cossens, 1993). Job rotation can also help improve worker vigilance (Krueger, 1991). Forestry workers also performed a variety of jobs, however it was observed that their rotation was not on a daily or weekly basis. Table 4 shows the percentage of workers that were doing each job.

Table 4 - Jobs performed

Logging Jobs	%	Forestry Jobs	%
Job rotation	33	Job rotation	49
Felling	17	Pruning with shears	24
Skid work	13	Pruning with jacksaw	6
Log making	6	Pruning with chainsaw	2
Breaking out	3	Planting	4
Trimming	3	Mensuration	1
Tractor operator	4	Thinning to waste	8
Skidder operator	9	Releasing	2
Hauler operator	3		
Bell operator	1		
Other	6	Other	2
Missing	2	Missing	2

Education

Over half (56%) of the work-force surveyed had spent between 1 and 3 years at secondary school. These results are similar to those found by Gaskin *et al.* (1989). Another 36% had spent 4 or 5 years at secondary school. Half of those surveyed had no formal educational qualifications. A further 18% had passed some school certificate subjects, 5% had attained University Entrance (U.E) and 4% had Higher School Certificate (H.S.C). A higher number of workers had passed U.E and H.S.C. than those found by Gaskin *et al.* These results are displayed in Table 5. Education level in forestry and logging were very similar.

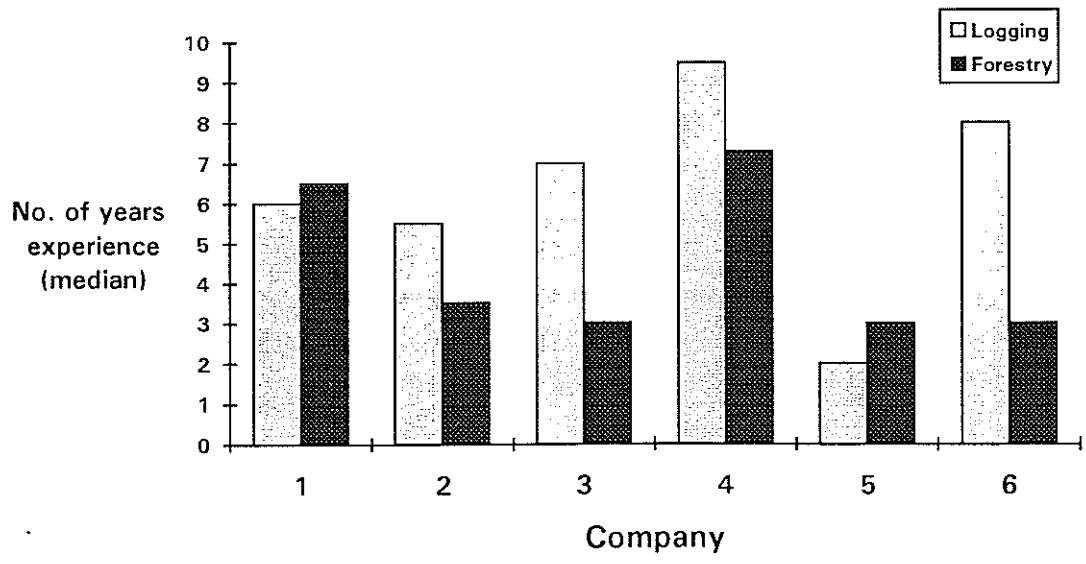
Table 5 - Education level of the workforce

Formal Educational Qualifications	%
None	53.7
School Certificate	17.8
University Entrance	5.3
Higher School Certificate	3.9
Trade Certificate	8.2
Diploma	0.7
Degree	0.2
Other	3.4
Missing	6.8

3.3 WORK EXPERIENCE

Job Experience

The median time spent working in logging was 6 years and in forestry it was 3 years. (The median gives a more accurate indication of experience than the mean because the distribution is skewed. The median is the middle value, half the sample is above the median and half are below). Company 4 has the most experienced workers in both logging and forestry, as displayed in Figure 6.



Figure

Figure 6 - Job experience

Crew Experience

Figure 7 shows that currently, the time spent in a crew was rather low, 2 years for logging and 1.5 years for forestry. Company 4 had the highest median of 4.7 years for logging and 4 years for forestry. Turnover has been identified as a serious problem in logging and forestry (Adams, 1993, Gaskin & Bomford, 1988). Top date, no similar turnover studies have been undertaken amongst the forestry workforce. Adams (1993) found 40% turnover per year within contract crews working for a large central North Island company. An additional 18% rollover occurred amongst the crews.

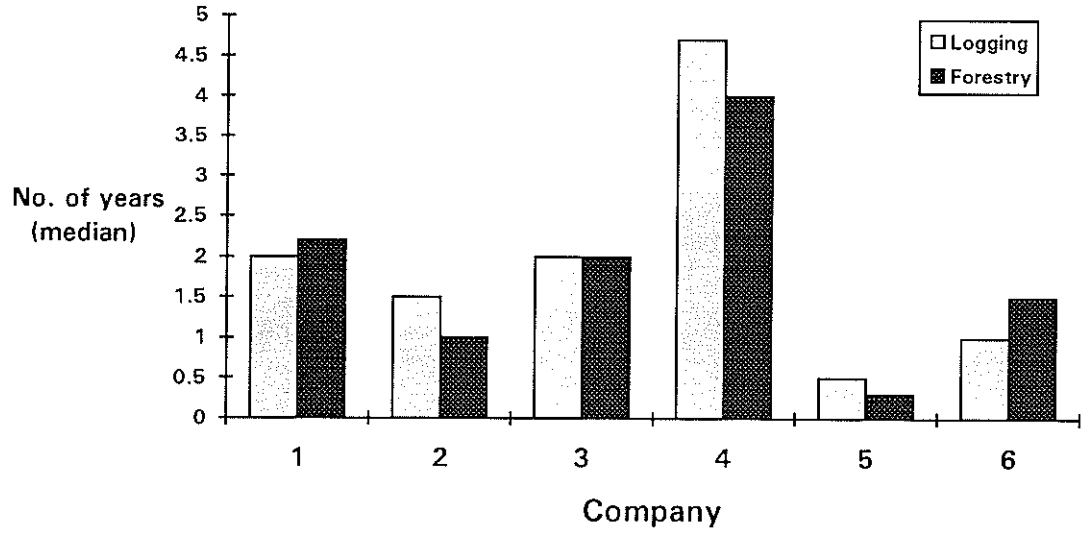


Figure 7 - Time spent in current crew

3.4 TRAINING

Probine, Grayburn, and Cooper (1987) emphasise the need for a well trained work-force because all forest operations are potentially dangerous. Training workers can also have other benefits, Adams (1993) reported that turnover was lower amongst those workers with formal training.

The Logging and Forest Industry Training Board (LFITB) recognises trained workers through the Forest Industry Record of Skills (FIRS) Modules. Figure 8 shows the number of workers who said they had passed some FIRS modules. Overall, 50% had passed FIRS modules. Half the work-force also stated they were presently working towards FIRS modules. Some workers (10%) had completed polytechnic courses in 1992. Age, race, and education, had no influence on the likelihood of workers passing of FIRS modules. The mean number of years job experience for workers with FIRS modules was 5.8 compared with 4.5 years for workers without FIRS modules.

The New Zealand Forest Owners Association (NZFOA) has set a target in their health and safety strategy of having all workers appropriately trained, or undergoing training, by 1996.

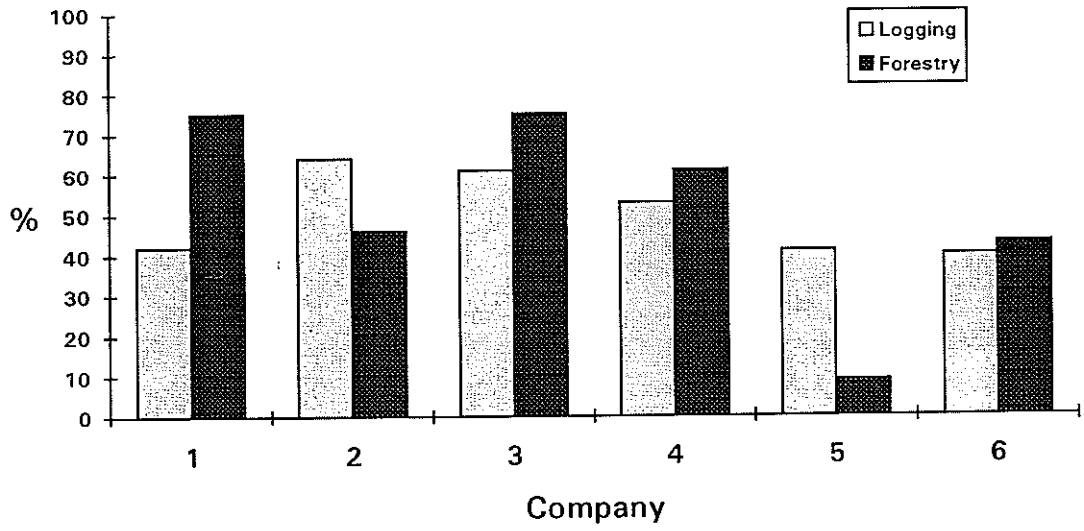


Figure 8 - Percentage of workers who have passed FIRS Modules

3.5 CONDITIONS OF EMPLOYMENT

Rest Breaks

Working in logging and forestry is very physically demanding (Parker & Kirk, 1994). It is important that workers have adequate rest breaks during the day so they do not become fatigued. Once workers become fatigued, their work rate will slow down and they may not be as alert (Kopardekar and Mital, 1994). This can make it difficult to perform the job safely. Table 6 displays the number and length of rest breaks for logging and forestry.

Table 6 - Rest breaks (length and number)

	0 min	30 min	40 min	45 min	60 min
Logging					
No break	1%				
1 break		18%		8%	10%
2 breaks		54%	6%	3%	
Forestry					
No break	9%				
1 break		15%			30%
2 breaks		40%	6%		

Just over half (54%) of logging crews and 40% of forestry crews have two breaks of 30 minutes. Thirty-six percent of the crews had one break which varied in length of time from between 30 minutes to an hour. Ten percent of the crews interviewed were not taking any breaks at all.

Start-Finish Times

The average time a forestry worker leaves home in the morning was 6.00 am, returning home around 5.00 pm. These times ranged from 4.00 am to 7.30 am in the morning and 3.00 pm and 7.00 pm in the evening. The average amount of time spent travelling was 43 minutes with a range of 10 minutes to 2.5 hours.

Loggers did not differ greatly with an average leave home time of 6.00 am and arrive home at an average of 4.50 pm. Times varied from 3.00 to 7.30 in the morning and 3.30 to 7.00 in the evening. Total travel times varied between 5 minutes and 2 hours with an average of 42 minutes.

Weekend Work

Table 7 shows the number of workers who stated that they work on the weekends. A large number of loggers were working on weekends two or three times a month (45%), with 11% working every weekend. The hours of work are high when travel time, hours on the job and weekend work are included.

Table 7 - Percentage of the workforce that work on the weekends

	Logging (%)	Forestry (%)
Never	9	37
Few times a year	22	42
Once a month	13	6
2 - 3 times a month	45	12
Every weekend	11	2

Payment Method

Figure 9 shows the difference in payment methods between logging and forestry crews. Most loggers (83%) are paid a wage whereas piece-rate is the most common form of payment in forestry (44%). Table 8 displays the method of payment for workers by each company region.

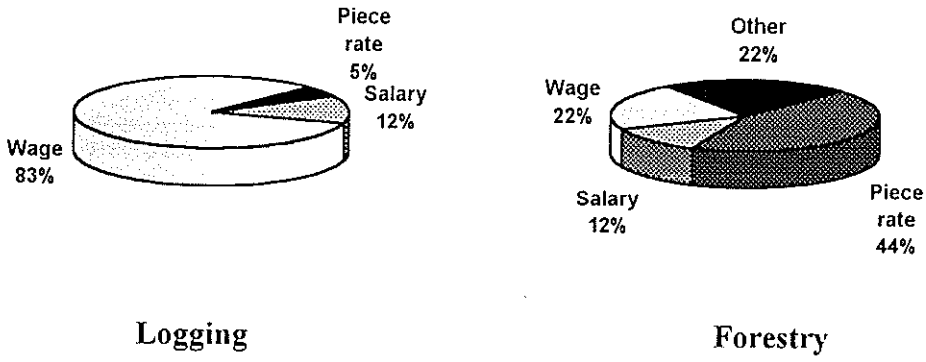


Figure 9 - Method of payment

Table 8 - Method of Payment by Company Region (%)

Company	Piece-rate	Salary	Wage	Other
1	28	32	28	12
2	32	13	44	11
3	0	0	89	11
4	16	16	50	18
5	0	47	53	0
6	42	0	50	8

4 - ATTITUDE RESULTS

The measurement of attitudes is a rather complex task, as attitudes are not real objects but abstractions in our minds. An attitude is very hard to define and can not be measured by a single question or statement. Measurement requires a group of statements or questions that are related to the attitude of interest. These questions are combined together to form an attitude scale. The questions used to create the scales in this project are listed under each attitude area.

Manager and supervisor scales were slightly different to those used for contractors and workers due to differences in the questionnaire. This means that some scores are not directly comparable between the groups interviewed. All scales have a range of 1 to 5. Any score below 3 represents a poor attitude in that area. Scores in the range of 3 to 4 are reasonable but suggest room for improvement. Scores in the range of 4 to 5 indicate a good attitude towards safety with a score of 5 being excellent.

4.1 SAFETY HARDWARE

Personal Protective Equipment (PPE)

This scale measures attitudes towards personal protective equipment (eg. helmets and chainsaw chaps). It incorporates all ratings of helpfulness of PPE (q18) and questions 30, 31, 32, 33 and 55. Generally, personal protective equipment was rated very highly by the majority of people surveyed, 83% agreed with the statement "I would wear the gear I wear now even if it was not compulsory". Figure 10 shows the PPE attitude scores for each company. Differences between companies are not statistically significant.

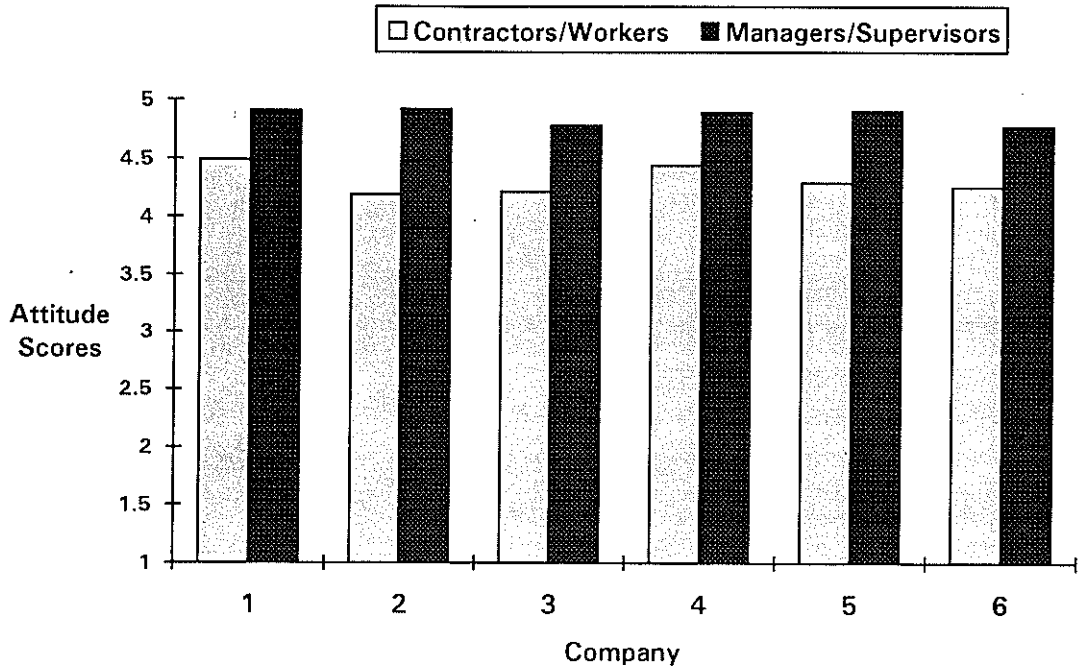


Figure 10 - Attitudes towards personal protective equipment (PPE).

There is a significant difference between the attitudes towards PPE held by loggers and forestry workers, as shown in Table 9. This is not surprising as forestry workers do not use much of the PPE being rated. In both logging and forestry, some workers commented that they had not seen or tried some of the more recently developed PPE such as high visibility clothing and spiked boots. Research has demonstrated that spiked boots dramatically decrease the number of times fallers slip over in slash and on logs (Kirk & Parker, 1992) and the use of high visibility clothing increases the chance of loggers being seen by operators of machinery and other loggers (Bradford, Isler, Kirk & Parker, 1992). As both these pieces of research had been published at least one year prior to this attitude study, the fact that workers had not seen or tried either spiked boots or high visibility garments should be of concern to the researchers, forest owners and the contractors.

Table 9 - PPE attitude scores

	SCORE	t-value
Managers	4.93	
Supervisors	4.79	1.66 ns
Contractors	4.45	
Workers	4.25	1.77 ns
Logging	4.4	
Forestry	4.08	4.06 **
Passed FIRS Modules	4.34	
No FIRS Modules	4.21	1.51 ns

** indicants significant difference ($p < 0.01$).
ns indicates there is no significant difference.

The Work Environment

Environmental conditions (noise, weather, dust, mud, fumes, weeds, and vibration) can make the job extremely difficult and increase the risk of accidents. The impact that these conditions can have on safety was demonstrated by Melamed, Luz, Najenson, Jucha, and Green (1989) who

found that accident involvement increased as the work conditions became more demanding. Under demanding conditions, workers who found the environmental conditions annoying were involved in more accidents than those who did not find the conditions annoying. The literature review on forest injuries by Slappendel *et al.* (1993) identified a number of studies that found heat, cold, rough terrain and windthrow were associated with increased risk of accidents.

The work environment scale includes all ratings of how annoying the environmental conditions are (q17), plus ratings of stress (q28), physical difficulty (q26), mental difficulty (q27), and danger (q36). The scale measures how demanding and annoying a person finds their work environment. Differences between the companies were expected due to the different regional weather conditions. These results are displayed in Figure 11. Managers' and supervisors' scores reflect how annoying or demanding they think the work conditions would be for the workers.

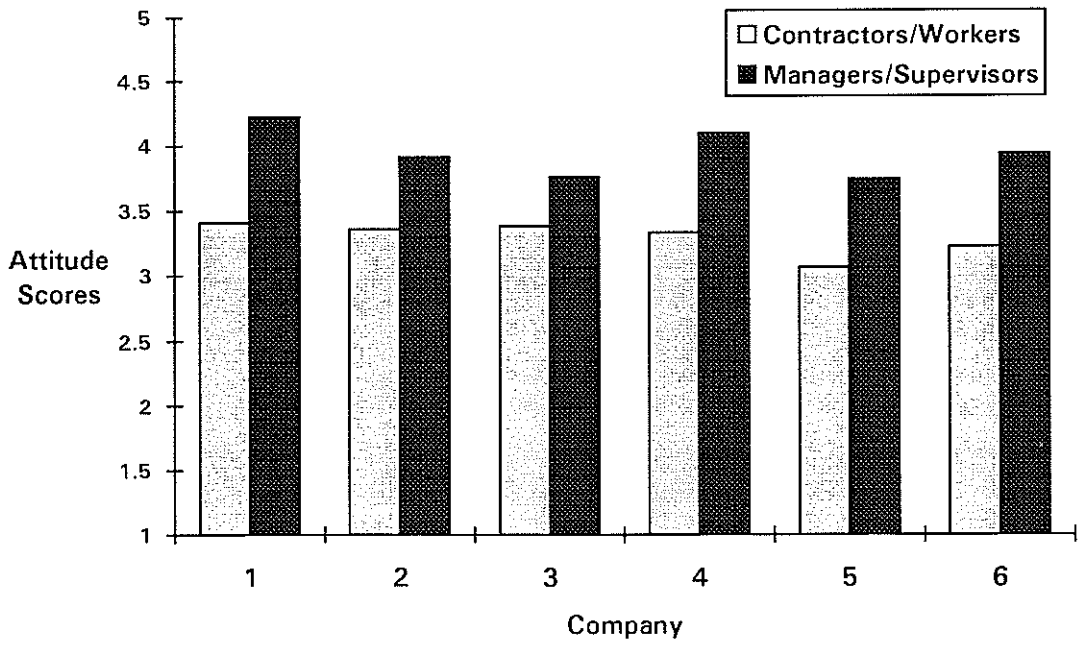


Figure 11 - Attitudes towards the work environment

Table 10 summarises the work environment scores. Loggers find the work environment more demanding/annoying than forestry workers.

Table 10 - Work environment attitude scores

	SCORE	t value
Managers	3.88	
Supervisors	3.96	0.6 ns
Contractors	3.31	
Workers	3.29	0.11 ns
Logging	3.39	
Forestry	3.17	3.23 **
Passed FIRS Modules	3.36	
No FIRS Modules	3.21	2.25 *

* indicates significant difference ($p < 0.05$).
** indicants significant difference ($p < 0.01$).
ns indicates there is no significant difference.

Managers and supervisors over-estimated the annoyance value of these conditions to the workers. Overall, loggers found the mud and weather most annoying while forestry workers found weeds and weather most annoying. Noise and vibration were rated as the least annoying conditions by the work-force.

4.2 SAFETY SOFTWARE

Safety software is used to describe safety policies, concepts and activities. On the 1st of April 1993, the Health and Safety in Employment Act 1992 (HSE Act) came into effect. This Act has important implications for both the logging and forest industry so the entire work-force should be aware of the Act.

Health and Safety in Employment Act (1992)

All contractors were aware of the HSE Act although 19% were unsure whether they fully understood it. Despite this high level of awareness, only 57% of contractors had a crew safety policy, and some of these contractors were referring to the company policy rather than their own separate policy. Awareness of the HSE Act was much lower amongst workers with 36% saying they had not heard of the Act. These results are displayed in Figure 12.

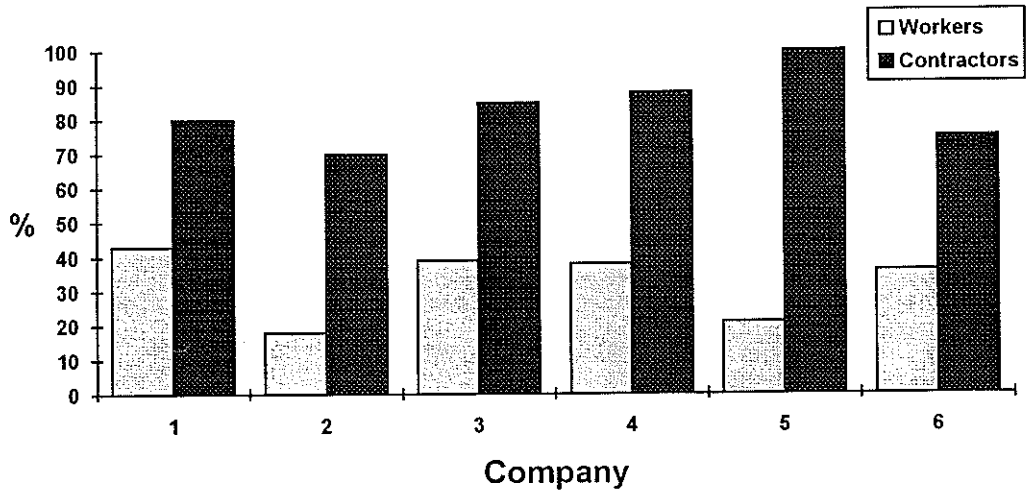


Figure 12 - Contractors and workers who said they understood the HSE Act (1992)

Company Safety Policy

Knowledge of the company safety policy was also poor. Figure 13 shows that many people do not understand the company safety policy. Everybody working in the forest needs to be aware of the HSE Act, company safety policy and operating procedures. A real effort needs to be made to educate and continually remind people about these safety matters. Walters & Haines (1988) suggested that workers would pursue safety matters more if they are aware of their rights and mechanisms for dealing with hazards.

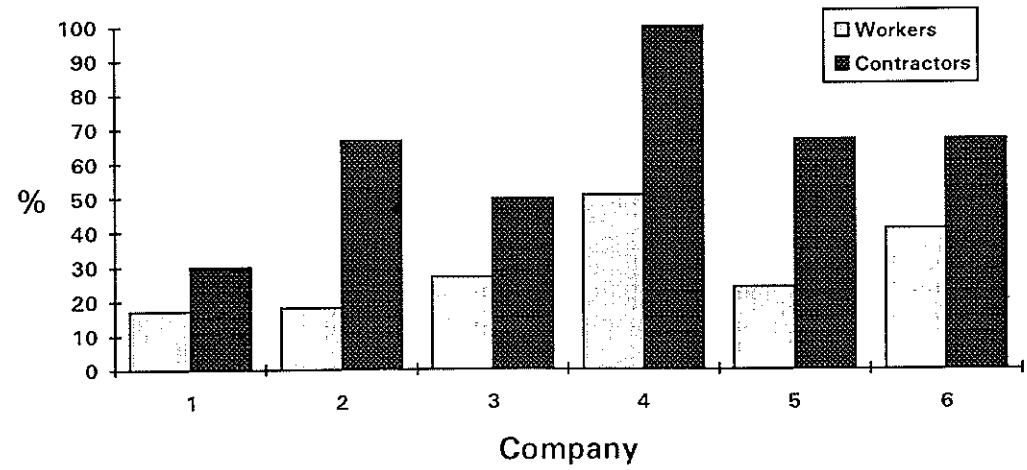


Figure 13 - Contractors and workers who said they understood the company safety policy

Attitudes Towards Safety Software

The software scale measures awareness of safety goals, meetings, and safety programmes (questions 67 to 71). The scale produced a number of interesting differences between companies, type of work, contractors and workers. The company differences are shown in Figure 14, and the summary of software scores in Table 11.

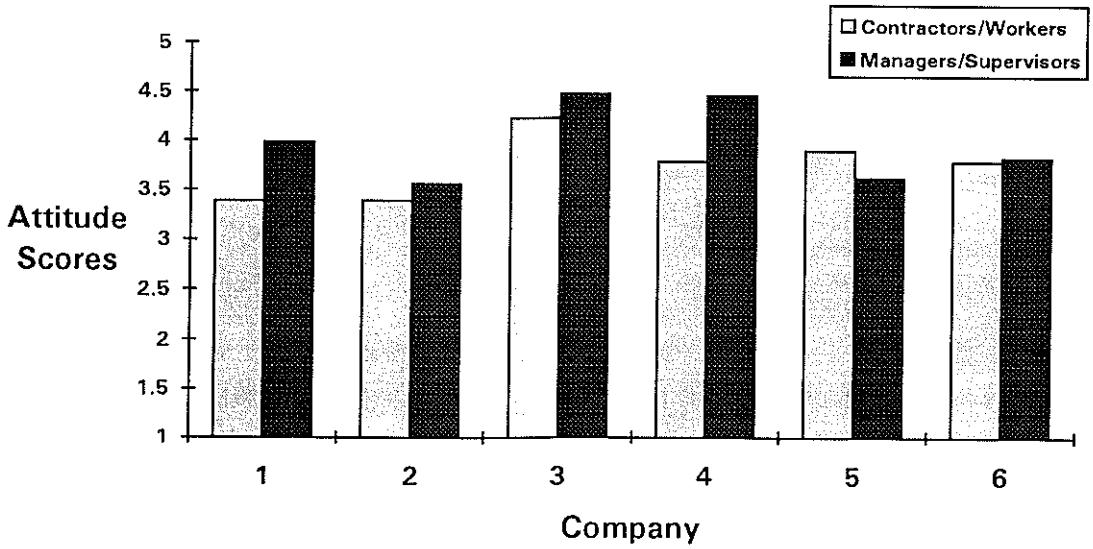


Figure 14 - Attitudes towards safety software

Table 11 - Safety software attitude scores

	SCORE	t - value
Managers	4.11	
Supervisors	3.93	1.06 ns
Contractors	4.05	
Workers	3.75	2.14 *
Logging	3.92	
Forestry	3.63	2.5 *
Passed FIRS Modules	3.85	
No FIRS Modules	3.67	1.39 ns

* indicates significant difference ($p < 0.05$).
ns indicates there is no significant difference.

Many managers and supervisors were unaware of their own company's injury/accident rate, yet all companies stated they have safety goals or targets. Goal setting is one of the most powerful ways of improving performance, but it will only work if there is regular feedback and reinforcement to everybody (Grummitt, 1990). Goals are meaningless without this. Companies and contractors need to monitor their safety performance in a professional manner and give everybody feedback on the progress.

Contractors were more aware of safety policies, concepts, and the HSE Act, than workers. Loggers had greater awareness than forestry workers which may reflect a greater effort in educating loggers rather than forestry workers. Workers who had passed FIRS modules scored higher than those who had not, however this difference was not statistically significant.

Attitudes Towards Safety Arrangements

This scale measures the perceptions of the work-force about safety arrangements (questions 34, 35, 37, 39, 41, 42, 43, 44, 48, 54, 60, and 62). From this scale, an impression can be formed on how well the work-force feels safety is handled. It includes questions relating to checks on safety equipment, how well safety problems are dealt with, whether there is conflict between safety and other job demands, and whether you have to take risks to complete the job.

Results suggest arrangements for safety are perceived to be reasonable (score = 3.5) but are not considered to be good (score = 4). A number of people felt that arrangements for safety were poor. Only 17% agreed with the statement "Production pressure has no effect on safety". The most common response by the work-force to the question "How can safety be improved?" was "Reduce pressure". Many workers wrote that they were under pressure and that there was conflict between safety and other job demands. The general impression was: "safety is important until you needed to get more wood down". Figure 15 shows the arrangement for safety scores for each company. There was very little difference in the scores of each company.

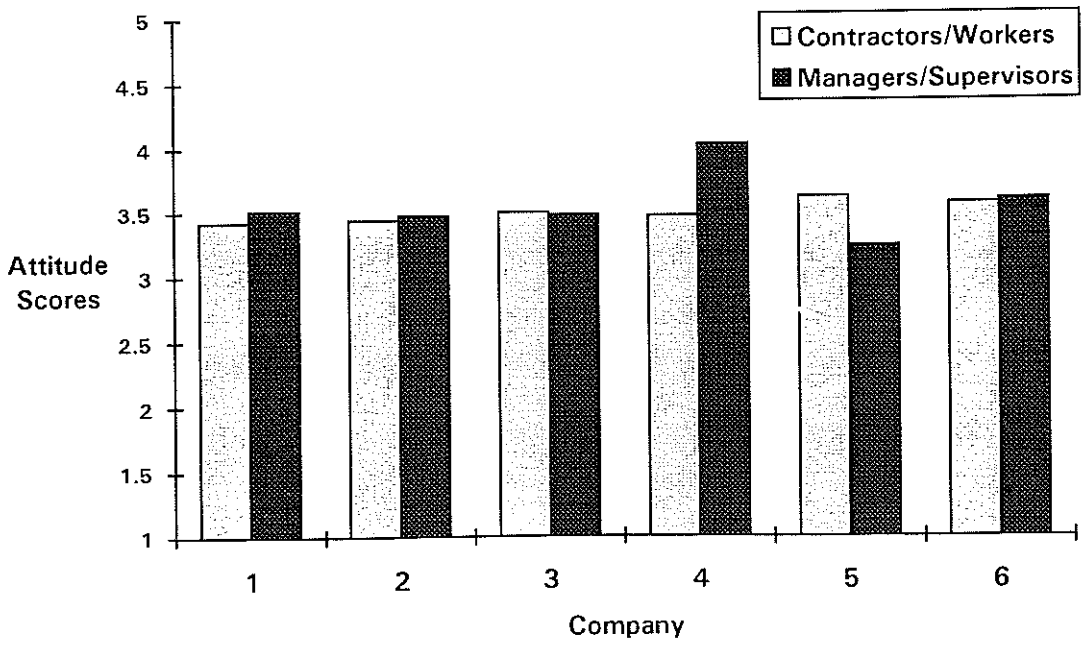


Figure 15 - Attitudes towards safety arrangements

Table 12 summarises the safety arrangement scores. There were significant differences between contractors and workers, and also between logging and forestry.

Table 12 - Safety arrangement attitude scores

	SCORE	t value
Managers	3.74	
Supervisors	3.44	1.68 ns
Contractors	3.69	
Workers	3.48	2.74 **
Logging	3.58	
Forestry	3.41	2.91 **
Passed FIRS Modules	3.54	
No FIRS Modules	3.47	1.25 ns

** indicants significant difference ($p < 0.01$).
ns indicates there is no significant difference.

4.3 RISK

Knowledge of risk

An earlier study by Tapp, Gaskin and Wallace (1990) found that logging workers were aware of the risks in their jobs. It appears that the majority of the industry are not aware of the actual number of workers that are injured or killed each year in forestry and logging. The number of people killed in logging during the 1992 calender year was nine, and the number of people killed during the 92/93 financial year was eleven. Research has shown that making people aware of these risks can increase safe behaviour. Griffith and Rogers (1979) found behaviour was improved by increasing perceptions of severity and chance expectancies of accidents.

Accident figures should be presented so they have an impact. Using the fatality rate reported by Gaskin (1988), if one's lifetime (30 years) is spent logging, the chance of being killed on the job is 7%, or one in every fourteen workers! This is another possible reason for the high turnover rate as 48% of the work-force said they would leave the job because of poor safety. Workers noted that "poor safety" was a reason for leaving their last crew.

Perceived likelihood of an accident occurring is only a minor aspect of hazard assessment (Hale & Glendon, 1987). When behaviour is well practiced and does not require conscious effort, then, increasing workers subjective risk estimates will not change behaviour (Howarth, 1988). However, it should help motivate some workers and management to take more interest in safety.

Attitudes Towards Risk

The risk scale used in this study only consisted of three questions (q38, q39 and 47) which measured whether a person thought that risks were part of the job, whether they enjoyed taking risks, and

whether injuries were just bad luck. It is not a measure of risk perception in terms of likelihood of an accident. Some questions did not apply to management so only contractor and worker replies were included. Earlier studies on risk perception (Tapp *et al.*, 1990) reported that loggers were aware of the risks in their job. This raised the question "why are the risks not avoided"?

This study found that 30% of the work-force and 10% of management thought that taking risks is part of the job, and 43% of the work-force reported that there are aspects of the job that force you to take risks. Another 20% believed that getting injured is just bad luck, with 13% being uncertain. If risks are considered as part of the job then they will never be avoided. The process of hazard identification should identify the areas of risk and control them through safety systems. Once again, attitudes need to be improved. There were no significant differences between the companies as shown in Figure 16.

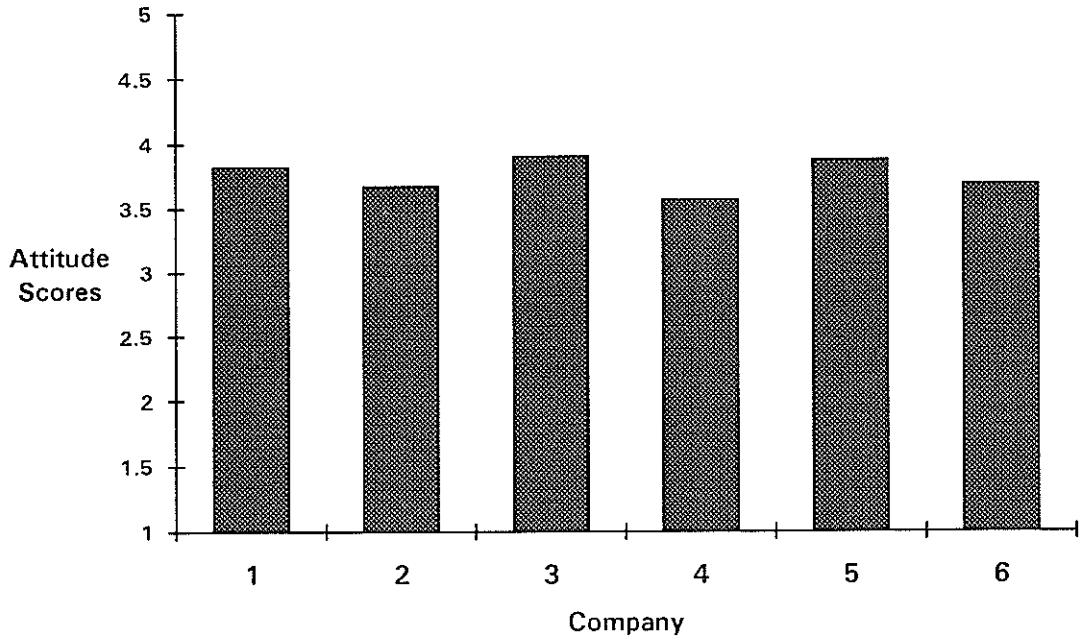


Figure 16 - Attitudes towards risk

Contractors demonstrated a better attitude towards risk when compared with workers. Logging workers also had more positive attitudes than forestry workers. There was no significant difference between workers with and without FIRS modules. These results are displayed in Table 13.

Table 13 - Attitudes towards risk scores

	SCORE	t value
Contractors	3.96	
Workers	3.71	2.13 *
Logging	3.9	
Forestry	3.55	4.16 **
Passed FIRS Modules	3.79	
No FIRS Modules	3.69	1.26 ns

* indicates significant difference ($p < 0.05$).
** indicants significant difference ($p < 0.01$).
ns indicates there is no significant difference.

4.4 PEOPLE

Attitudes Toward the Value of Safety

This scale aims to measure perceptions of the value of safety, and whether people are sceptical about what safety can do (questions 30, 45, 46, 50, 55, 56, 58, and 61). Scores reflected a positive attitude towards the value of safety but were not high enough to be classified as good attitudes. Many people disagreed with the statement 'All injuries are preventable' and agreed with 'There is no point in reporting a near miss'. These replies lowered the value of safety scores. The statement that 'All injuries are preventable' must be hard to believe in the logging and forest industry due to the high number of injuries. However, 'All injuries are preventable' must be part of management safety policy or accidents will be accepted as part of the job or just as bad luck. When this happens, active steps are not taken to avoid the same accident happening again in the future.

The same can be said about near misses. It appears that many workers and contractors consider near misses as injuries that do not result in lost time but could have under different circumstances. Near misses are any unplanned events that under slightly different circumstances, could have resulted in injury, loss to process, or property damage (Bird & Germain, 1986). A number of these events were observed while conducting the survey and were not considered important by the workers. Figure 17 displays the attitude scores for each company. The managers and supervisors of company 4 have very positive attitudes in this area.

Table 15 - Responsibility attitude scores

	SCORE	t value
Managers	4.52	
Supervisors	4.41	0.97 ns
Contractors	4.4	
Workers	4.15	3.69 **
Logging	4.29	
Forestry	4.04	5.31 **
Passed FIRS Modules	4.23	
No FIRS Modules	4.14	1.91 #

# indicates significant difference ($p < 0.1$).
** indicants significant difference ($p < 0.01$).
ns indicates there is no significant difference.

Attitudes Towards Control of Safety

This scale attempts to measure the concept 'Locus of Control' developed by Rotter (1966). Much research has been devoted to understanding locus of control with many interesting findings. 'Internal' locus of control individuals believe that they have control over the things that happen to them. 'Externals' believe that the things that happen to them are outside their own control. Past research suggests that 'externals' are more likely to suffer stress, become depressed, and anxious (Powell and Vega, 1972).

With regards to safety there is some debate as to whether it is best to have an external or internal locus of control. Internals may believe that since they can control their own safety, they do not have to take protective measures. Externals will take all protective measures because they feel they have no control over their safety. The other view is that externals may believe that accidents are beyond their control so there is nothing they can do about it, while internals believe they can do something. This view was supported by James & Weubler (1988, cited in Sherry, 1991) who found externals were involved in more accidents.

A score above four would indicate a strong internal locus of control while a score below two would indicate a strong external locus of control. The results displayed in Figure 19 suggest that the work-force does tend slightly towards an 'internal' locus of control in regards to safety. However, scores are only just above 3, indicating that many workers still believe that accidents are outside their control.

There was little difference in locus of control scores between contractors and workers, and no difference between logging and forestry, or those with or without FIRS modules. These results are displayed in Table 16 indicating that perceptions of control do not vary between logging and forestry, nor do they change with training. Training needs to show workers how they can work together to control their safety. However, people need to be careful of illusions of over control. Over confidence in one's ability is dangerous and can lead to accidents (Hale & Glendon, 1987).

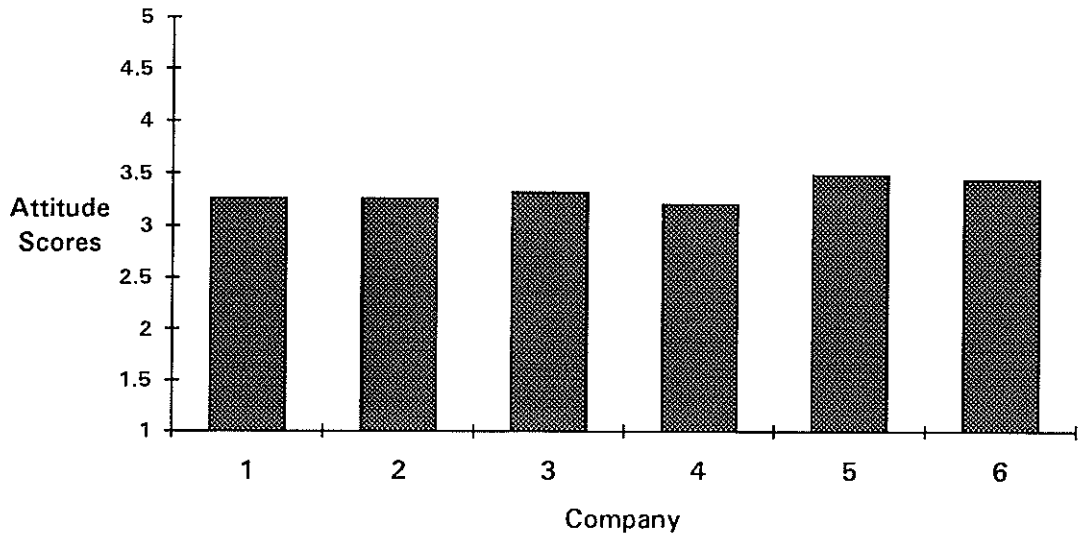


Figure 19 - Locus of control

Table 16 - Locus of control scores

	SCORE	t value
Contractors	3.45	
Workers	3.32	1.72 ns
Logging	3.32	
Forestry	3.37	1.04 ns
Passed FIRS Modules	3.35	
No FIRS Modules	3.33	0.32 ns

ns indicates there is no significant difference.

Contractors Handling of Safety (CHS) Scale

The contractors handling of safety (CHS) scale indicates workers ratings of how safety is handled by their boss (questions 16i, 25i, 34, 41, 66, 69, 70, 72i, 73, and 75i). It includes questions on safety behaviour, meetings, checks and general attitude. There were significant differences between the contractors working for different companies, which are displayed in Figure 20. Contractors in companies 3, 5 and 6 scored well on this scale while the scores for contractors in companies 1, 2, and 4 were acceptable. All contractors should be aiming to score close to 5.

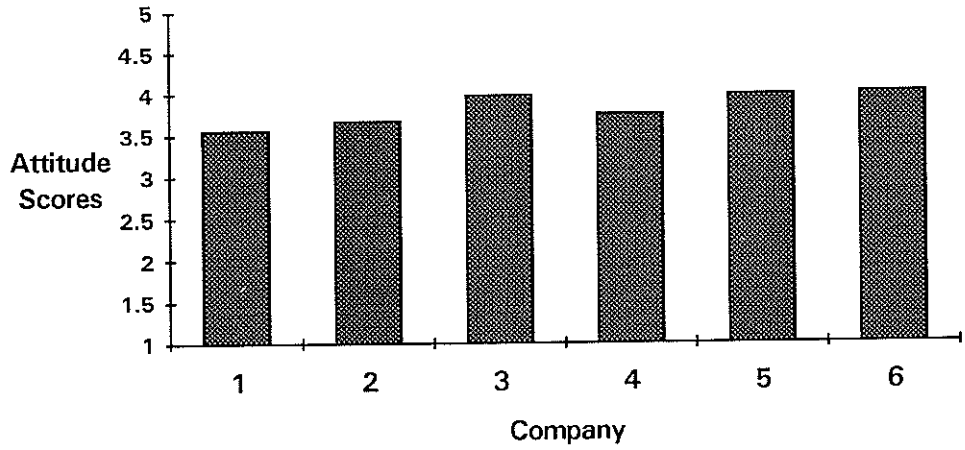


Figure 20 - Contractors handling of safety (CHS)

Table 17 shows that most contractors rated themselves highly on their handling of safety. Workers ratings were not as high but do show that most contractors are making checks on safety and are dealing with safety problems. There were no differences between the contractors in logging and forestry. Workers who had passed FIRS modules did not rate their contractor differently from those who had not.

Table 17 - Contractor handling of safety scores

	SCORE	t value
Contractors	4.41	
Workers	3.87	2.0 *
Logging	3.89	
Forestry	3.84	0.68 ns
Passed FIRS Modules	3.91	
No FIRS Modules	3.82	1.19 ns

* indicates significant difference ($p < 0.05$).

ns indicates there is no significant difference.

Supervisor Handling of Safety Scale (SHS)

Similar to the CHS scale, this scale rates the supervisors handling of safety (questions 16ii, 25ii, 35, 42, 71, 72ii, 74, and 75ii). Figure 21 shows that there are some significant differences between companies. Surprisingly, supervisors received lower ratings than contractors. Part of this is due to questions regarding frequency of safety talks where supervisors average weekly and contractors daily. Supervisors from company 4 received the best ratings for their handling of safety.

An interesting finding was the difference between logging and forestry. Forestry supervisors do not appear as committed to safety as logging supervisors. This is displayed in Table 18. Contractors rated supervisors handling of safety higher than workers.

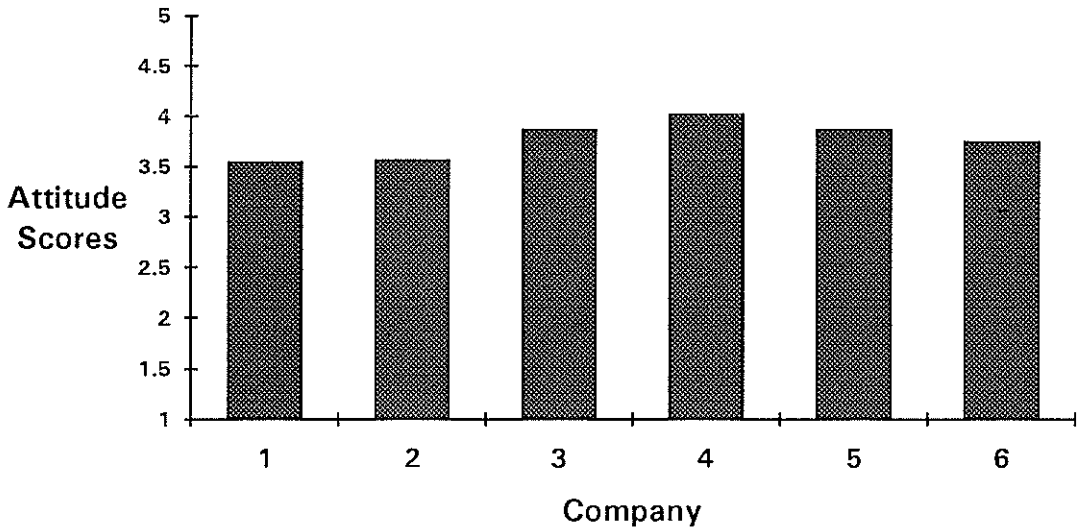


Figure 21 - Supervisors handling of safety

Table 18 - Supervisor handling of safety scores

	SCORE	t value
Contractors	3.93	
Workers	3.74	1.66ns
Logging	3.94	
Forestry	3.53	5.38 **
Passed FIRS Modules	3.78	
No FIRS Modules	3.73	.57 ns

** indicants significant difference ($p < 0.01$).

ns indicates there is no significant difference.

General Perceptions of Commitment to Safety

Workers' perception of managers' commitment to safety is one of the most important determinants of the safety climate (Dedobbeleer & Beland, 1991). Unless a worker thinks their boss and supervisor are committed to safety, efforts to improve safety will not be successful. To help measure this commitment, workers were asked whether they thought their boss, supervisor, and workmates believed that "Safety is more important than profits, production or quality". The percentage of workers who said 'yes' are presented in Figure 22.

Workers had low perceptions of commitment with 53% believing that their boss was committed to safety, 48% believe their supervisor was committed, and 52% believe their workmates were committed to safety. Results for contractors were slightly better, with 75% saying they believed safety was more important than profits, production, or quality. Sixty-seven percent thought that their supervisor was committed to safety and 59% thought that their workers were committed to safety. These results are displayed in Figure 23.

Managers and supervisors were also asked whether they believed that "Safety is more important than profits, production and quality", whether their company believed it, and whether they thought workers would believe that the company was committed to safety. The majority of supervisors (81%) stated that they believed safety was most important. Only 59% thought the company believed that safety was most important, and only 14% stated that the workers would believe that the company thought safety was most important. Figure 24 displays these results for each company.

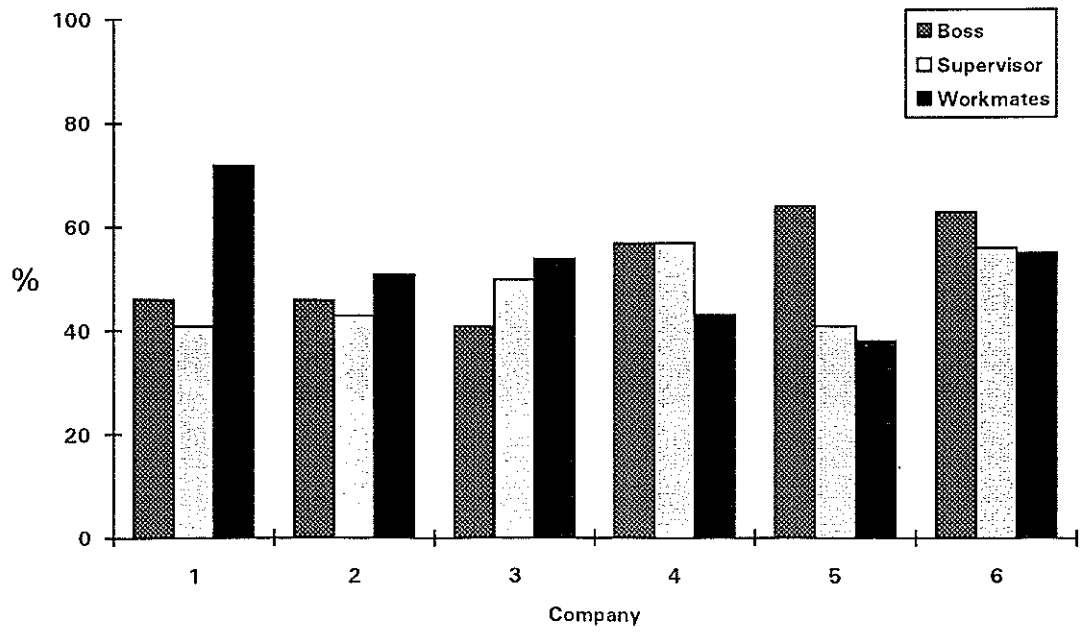


Figure 22 - Workers' perceptions of commitment

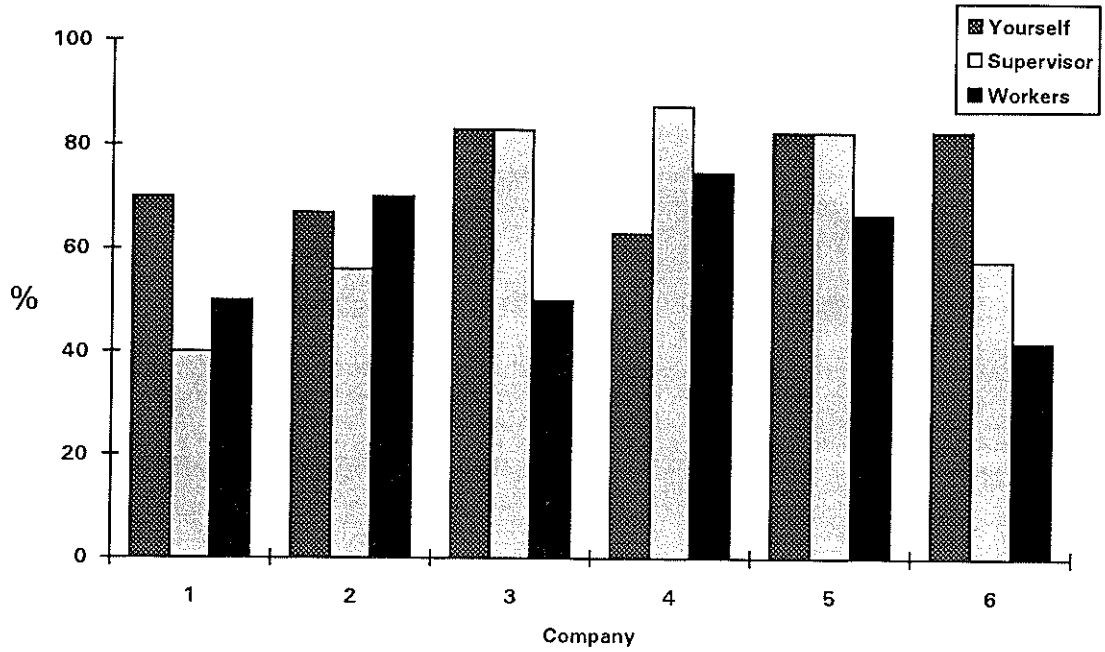


Figure 23 - Contractors' perceptions of commitment

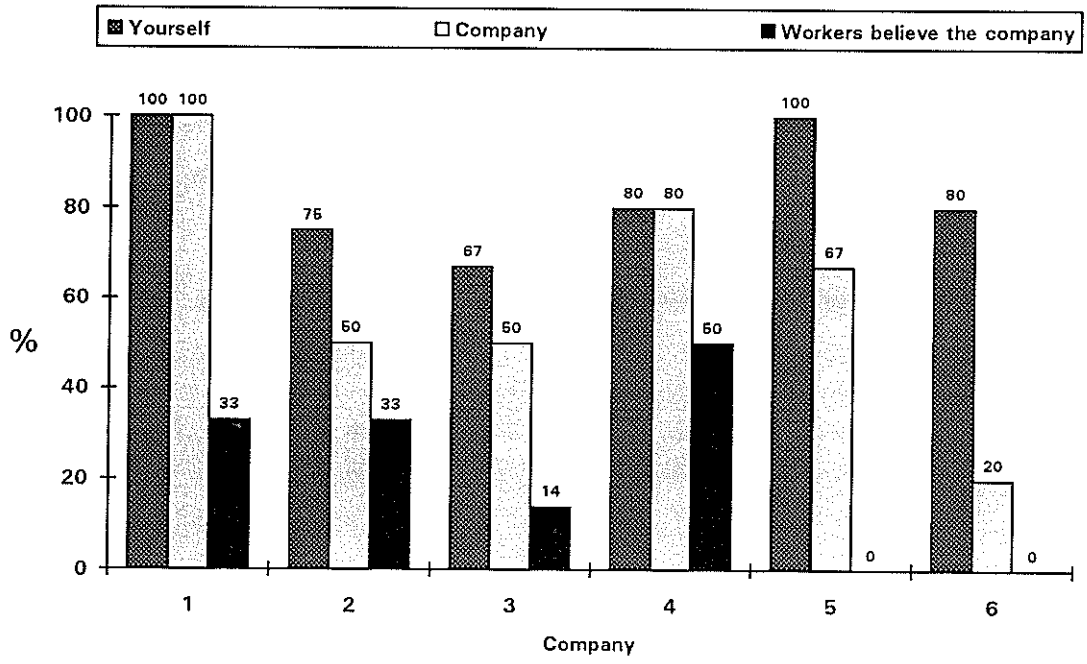


Figure 24 - Supervisors' perceptions of commitment

Managers were asked the same questions as the supervisors. Most managers (82%) stated that they did believe that safety was more important than profits, production or quality. A further 80% stated that their company believed this. However, only 27% of managers thought that the workers would believe that the company believes safety is number one (Figure 25).

Managers and supervisors believe they have not convinced the work-force that they are committed to safety. In the work-force itself, many contractors and workers doubt whether their workmates are committed to safety. These perceptions of commitment must be changed. Research indicates the only way to improve this perception is through full pro-active commitment that must start at senior management (Griffiths, 1985). If people do not believe that the industry is really concerned about safety, and not just meeting the requirements of the Health and Safety in Employment Act, then the efforts to improve safety will not be very effective.

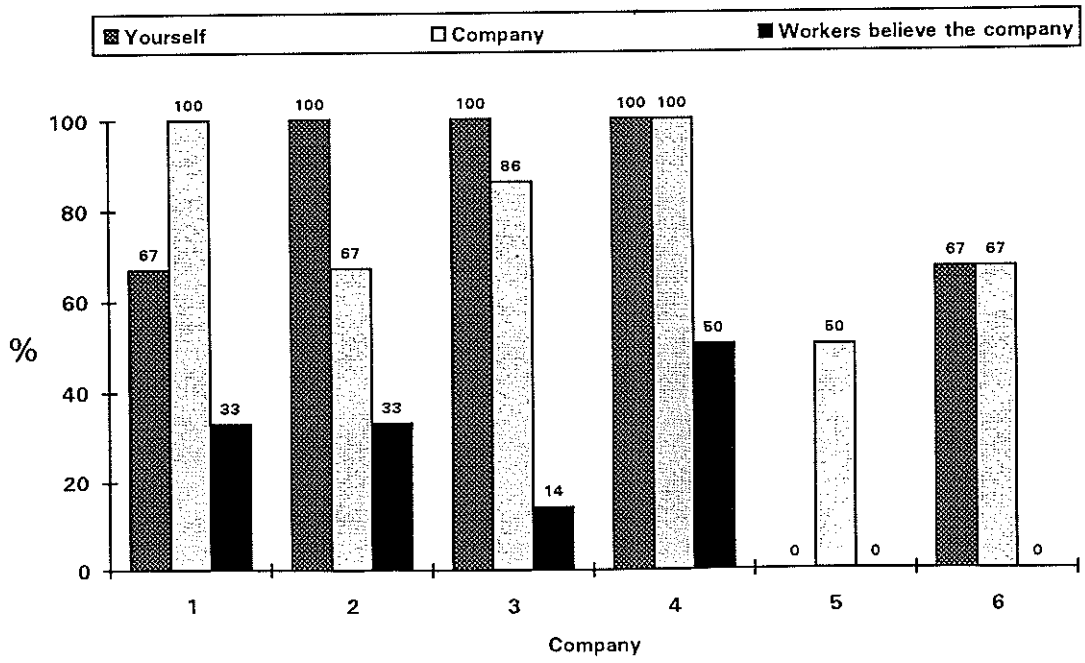


Figure 25 - Managers' perceptions of commitment

4.5 TOTAL ATTITUDE SCORES

Overall, the attitudes towards safety amongst the work-force did not differ between the companies. Figure 26 shows that the managers and supervisors of company 4 had more positive attitudes towards safety than the other companies, but this difference was not statistically significant.

Table 19 shows there is no significant difference between the attitudes of managers and supervisors. Contractors have better attitudes towards safety than workers, and the logging work-force has better attitudes than forestry. This could be due to a greater emphasis being placed on logging in the past. None of the groups had bad attitudes towards safety. However, in such a hazardous occupation attitudes need to be excellent. Overall, attitudes of most contractors, supervisors, and managers would be classified as good, managers' and supervisors' of company 4 as very good, and the workers' attitudes as reasonable.

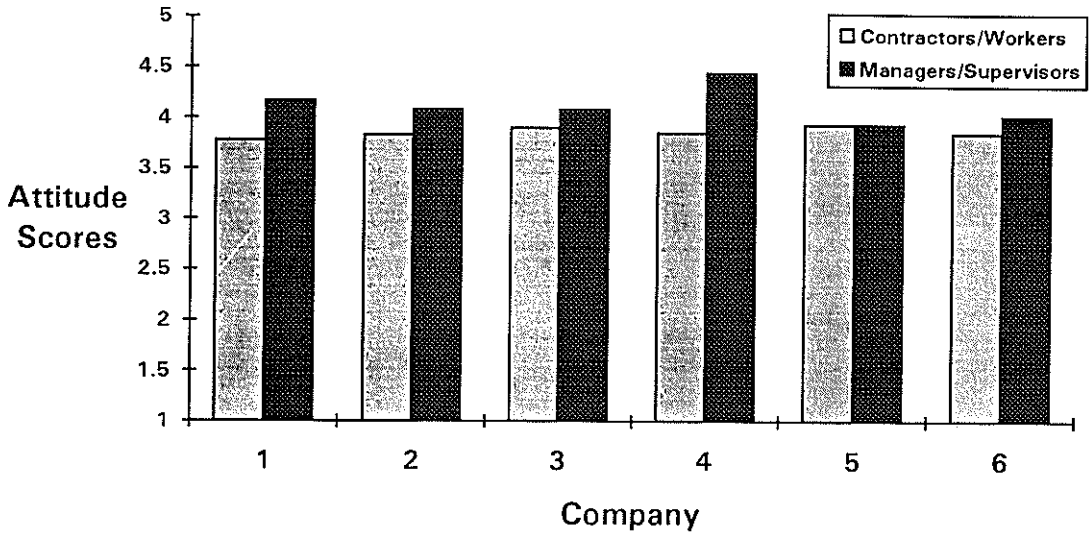


Figure 26 - Total attitude scores

Table 19 - Total attitude summary

	SCORE	t value
Managers	4.2	
Supervisors	4.05	1.5 ns
Contractors	4.03	
Workers	3.83	3.15**
Logging	3.92	
Forestry	3.76	2.58 *

* indicates significant difference ($p < 0.05$).

** indicants significant difference ($p < 0.01$).

ns indicates there is no significant difference.

Attitudes and General Characteristics

Workers who had passed FIRS modules achieved slightly higher scores on all attitude scales, however these differences were not statistically significant. No relationship was found between education and attitudes, or ethnic origin and attitudes. There were significant correlations between age, crew experience, job experience, and safety attitudes. These relationships are very small, but show safety attitudes improve slightly with age, greater crew experience, and job experience (these three variables are correlated with each other, r = 0.6). This is another advantage to having a more experienced, older, stable work-force.

4.6 GENERAL COMMENTS ON ATTITUDES TOWARDS SAFETY

All managers, supervisors, contractors and workers were asked "How can safety be improved and accidents reduced in your job?" The replies can be grouped into the following 12 general categories displayed in Table 20.

The majority (62%) of managers and supervisors, along with a few contractors and workers, mentioned the need for more training and education. Many felt that there should be compulsory induction training and that everyone should meet LFITB standards. The need for greater commitment was mentioned by 18% of managers and supervisors and has already been discussed earlier in this report. A change in attitude is required from everyone working in the logging and forest industry. Safer work techniques and mechanised systems are both good ways of reducing accidents (Gaskin, 1990; Laflamme & Cloutier, 1988). The logging and forest industry will need to devise new techniques to perform many of their operations if they wish to reduce accidents. These techniques must eliminate the current hazards which are causing injury. More meetings and safety programmes are also useful ways of increasing safety awareness and improving safety (refer to section 5.4).

Table 20 - Suggestions on how to improve safety

Suggestion.	Managers & Supervisors - %	Contractors & Workers - %
Training and education.	62	6
Greater commitment and professional approach.	18	4
Change in attitude required.	16	1
Safer work techniques.	12	6
Greater awareness.	12	2
More safety meetings and programmes.	10	5
Reduce pressure - targets. Slow down.	6	23
Increase in pay so you don't have to push yourself.	0	8
Pay more attention, be more careful.	0	4
Identify the hazards	6	2
Better communication and looking out for yourself.	6	5
Mechanisation	6	1

The most common complaint from workers was that there was too much pressure to produce. Logging workers commented that safety came second when they had to get the trees down to meet targets. Others commented that they felt they had to push themselves to earn a decent living. This is a difficult problem to address as one workers definition of pressure may not worry another worker. Better communication within the industry could help this problem.

5 - ACCIDENTS

5.1 ACCIDENT FREQUENCY

In both logging and forestry, 16% of the sampled work-force reported having had a lost-time accident in 1992. As this percentage is higher than what was reported to either LIRO's Accident Reporting Scheme (ARS) or by the forest companies, and highlights the problem of accident under-reporting. Figure 27 shows the number of lost-time accidents for each company. The differences between the companies were not statistically significant. The results presented in this figure suggest that forestry is as hazardous occupation as logging.

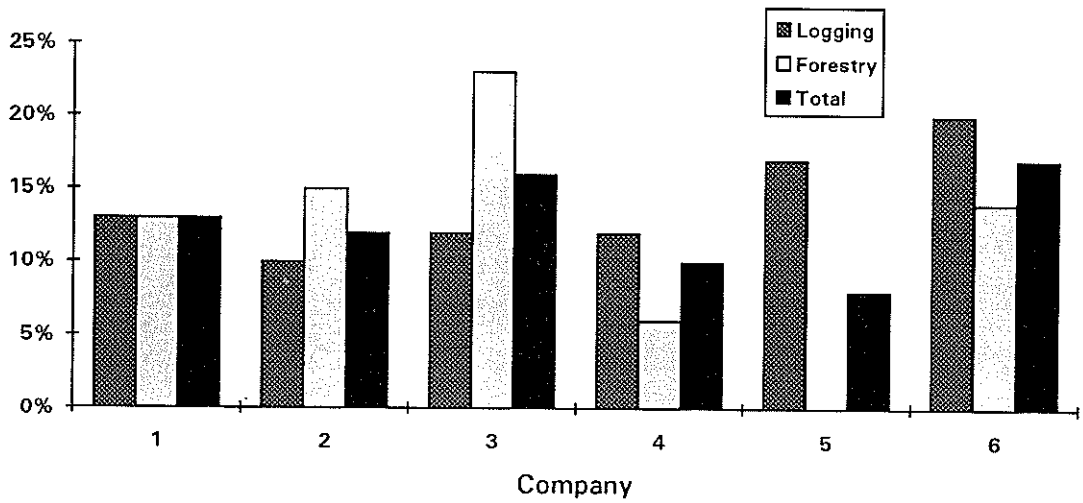


Figure 27 - Accident frequency

5.2 ACCIDENT SEVERITY

Logging accidents resulted in a mean of 33 days off work and a median of 6.5 days. The mean is distorted because of one accident causing 1 year off work which is why the median is presented. If this unusual case is excluded, the mean is similar to the ARS figure of 10.4 ± 2.1 days (Parker, 1993a). The mean for forestry was 15 days with a median of 4 days. The mean is much higher than the 5.8 days reported by Parker (1993b) although the median is similar. These figures show that forestry accidents are not as severe as those occurring in logging. Figure 28 displays the number of days lost due to an accident and Table 21 shows the number of days spent in hospital.

The majority of forestry injuries (79%) did not result in hospitalisation. A large number of logging injuries (56%) required one day in hospital with the maximum number of days spent in hospital totalling 14 days.

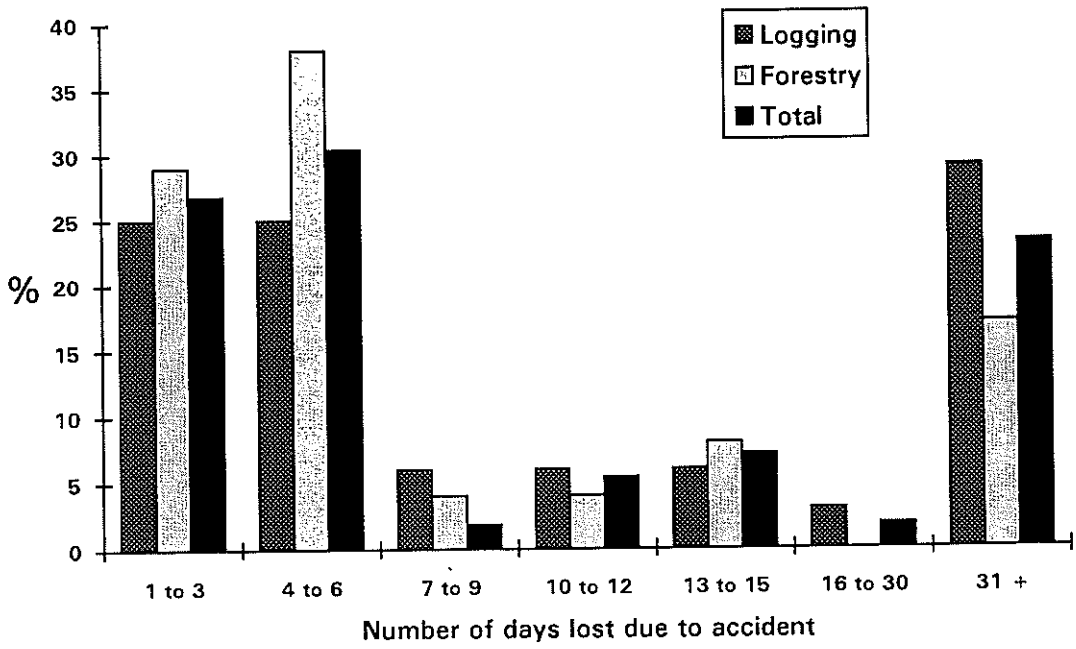


Figure 28 - Accident severity

Table 21 - Number of days in hospital

Days spent in Hospital	Logging (%)	Forestry (%)
0	29	79
1	56	17
3	3	0
5	6	4
7	3	0
14	3	0

5.3 GENERAL CHARACTERISTICS AND ACCIDENTS

Many characteristics of an organisation have been found to be related to accident frequency; such as turnover, experience and training (Smith, Cohen, Cohen, and Cleveland, 1978; Simonds and Shafai-Sahrai, 1977). In this study it was found that education, ethnic origin, job experience, crew experience, and payment method were not related to accidents. Other studies have found injury rates higher among loggers with less than a years experience (Klen, 1988). However this is in contrast to the results found by Kawachi, Marshall, Cryer, Wright, Laird and Slappendel (1991) who found a lower injury rate among New Zealand loggers with less than one year experience.

Age and training were related to accidents. The mean age of those that had an accident was 26, and the mean for those who did not was 29. This was a significant difference at p=0.006 suggesting that greater age is associated with less accidents. This is in contrast to the findings reported by the International Labour Organisation (ILO) (1981) which suggest greater age is associated with more injuries. No relationship between age and accidents were found in the New Zealand epidemiological study by Kawachi *et al.* (1991).

5.4 SAFETY ATTITUDES AND ACCIDENTS

Safety software was the only scale related to accidents (Figure 29). This scale does not reflect an attitude, but knowledge of safety programmes. The software scale measured awareness of safety programmes, goals, and meetings. The mean score of those who did not have an accident in 1992 was 3.82. The mean score of those who did have an accident in 1992 was 3.51. This difference was significant at p=0.051. This indicates that safety programmes, meetings, and goals are correlated with less accidents. Alternatively, safety programme awareness may be an indicator of organisational factors such as safety climate and management commitment.

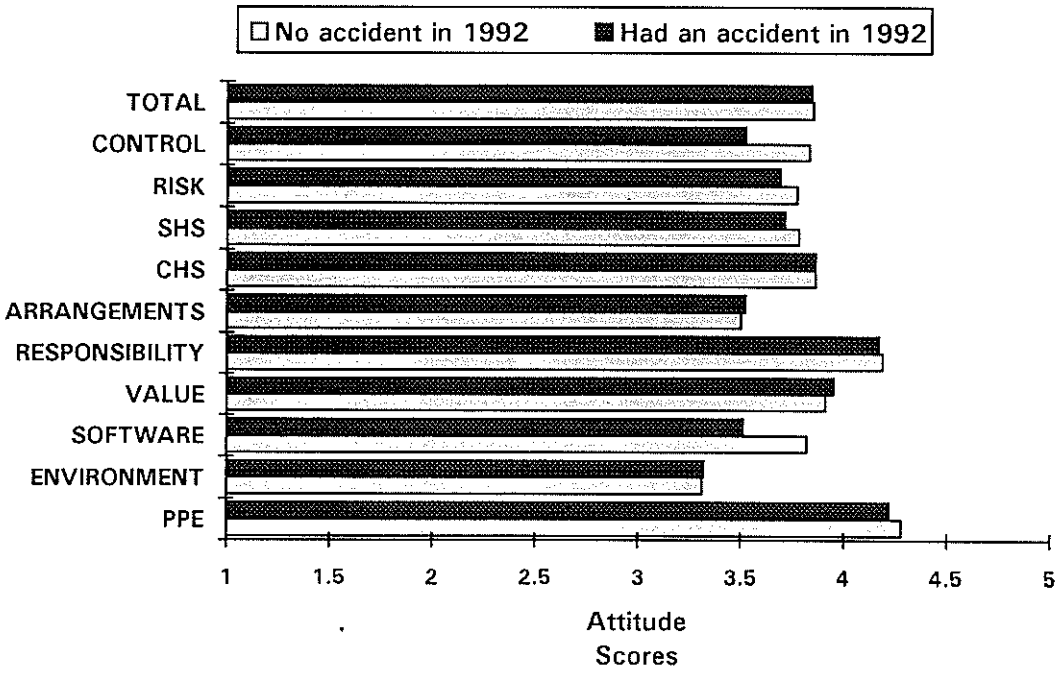


Figure 29 - Attitudes and accidents

5.5 ATTITUDES TOWARDS ACCIDENT INVESTIGATIONS

Most workers were not very worried about accident investigation practices stating that generally they were happy with it. However, it appears that accident investigations in 1992 did not have very good follow up procedures. Table 22 shows that only 24% of workers stated that somebody came back and checked that the recommendations were carried out, with another 18% unsure if there was any follow-up

After an accident, the crew (and company) should get together to see how the accident occurred and how it can be avoided in the future. Once again this happened in only 24% of the accidents in 1992 (Table 23).

In the majority of accidents (65%), workers did not receive any assistance to help them recover and re-enter the work-force, this is displayed in Table 24. This is a major weakness with current follow up procedures as re-occurring injuries, such as back pain, can be prevented (Vayrynen & Kononen, 1991). Effective rehabilitation programmes can lead to an early return to work, and reduce the number the number of accidents (Asma, Hilker, Shevlin, & Golden, 1980).

Despite this apparent lack of follow-up procedures, only 21% of the workers were unhappy with their accident investigation. These results are displayed in Table 25.

Table 22 - Recommendation followed up

	Percentage
Yes	24
No	58
Don't know	18

Table 23 - Crew discuss accident

	Percentage
Yes	24
No	54
Don't know	22

Table 24 - Assist re-entry into workforce

	Percentage
Yes	26
No	65
Don't know	9

Table 25 - Satisfaction with investigation

Very unhappy	13
	8
All right	28
	36
Very happy	15

5.6 PROBLEMS WITH ACCIDENT INVESTIGATIONS

A serious problem with current accident investigations is that the recommendations are not preventing the same accident occurring again in the future. Evidence of this can be seen in the ARS and Occupational Safety & Health bush bulletins, similar accidents are occurring repeatedly. One of the most common problems is attributing the cause of the accident to lack of care or attention. In doing this, people are making the "fundamental attribution error". This term is used to describe the tendency of observers to attribute other people's behaviour to internal factors such as their personality and ability. However, when the observer is placed in the same situation, they describe their own behaviour in terms of the external situation.

If one assumes that all workers have equal chance of being involved in an accident, then by random chance alone, some workers will have 3 accidents in a year, others will have 1 or 2 and the majority of the work-force will have none. Generally, the ones that have accidents are not being any more careless or less attentive than those that do not have accidents. Paying attention over long periods of time is a problem of vigilance. In logging, one needs to watch were they step, what is above them, happening around them, as well as concentrate on their chainsaw. This requires selective attention, the environment has to be continuously monitored for hazards. Due to limitations of human sensory capacities, individuals are not capable of noticing everything. Errors are made in all occupations, but in forestry and logging they can have fatal consequences.

A classic experiment demonstrating the difficulty of paying attention was conducted by Mackworth (1948) using a monitoring task. Mackworth devised a clock that jumped two seconds, instead of one second at random intervals. Mackworth asked subjects to note down every time this double jump occurred. Subjects missed 15% of these double jumps in the first half hour. This increased to 25% in the second half hour indicating a loss of attention. Mackworth told the subjects they were making these errors and asked them to try harder (be more careful). This did not change the results.

The worst thing you can do in accident investigations is tell people to be more careful, as this is blaming the individual and accepting the hazards (Kletz, 1993). This will not stop the same mistakes occurring again. The logging and forest industry needs professional training on modern theories of accident causation and how to conduct proper accident investigations based upon these theories.

6 - CONCLUSION

This study emphasises the need for a greater commitment to safety from the forest industry. Results from this survey suggest that attitudes at all levels need to be improved. There were a number of positive findings including very good attitudes towards personal protective equipment and an acceptance of responsibility for safety. However, attitudes towards the control of safety, the value of safety, and perceived commitment need to be improved. A number of important findings of this study are listed below.

- Knowledge of the HSE Act and company safety policies was low among workers.
- Knowledge of safety goals and safety performance was low.
- Awareness of safety programmes and goals was associated with less accidents.
- In the work-force, 53% agreed that there was conflict between safety and other job demands.
- Risk taking was considered as part of the job by 30% of the workforce.
- Management attitudes towards the value of safety were lower than the workforce.
- Many workers thought that they did not have control over their own safety.
- In the total sampled, 50% did not believe that all accidents are preventable.
- Perceptions of commitment to safety were very low.
- In both forestry and logging, 16% of workers had a lost time accident in 1992.
- Attitudes were not related to accidents.
- There appears to be little follow-up after accidents, or any rehabilitation.
- Worker carelessness and lack of attention is emphasised as a cause of accidents.

6.1 RECOMMENDATIONS

The findings of this project and past research suggest that simply training the work-force will not eliminate accidents, although it is a major step in the right direction. A massive education and training programme is required to show companies what can be done, but this programme needs to start with senior management and not the workers. Management must create the climate for improving safety. Management commitment is the single most important factor in improving safety. Griffith (1985) stated that "unless senior management has a positive approach to controlling safety in the same way as it controls production, quality, costs and sales, then the number of accidents will not be significantly reduced".

To improve safety in the forest and logging industry, the safety strategy has to start with changing the attitudes of senior management. Management need to be

trained on how to handle safety and incorporate safety into management systems. Waggenaar, Hudson, and Reason (1990) stated that risks are created high up in organisations and it is at this level that risk communication should be directed. Management must remove these risks and implement behavioural modification and comprehensive ergonomic programmes within their companies.

Guastello (1993) did a review of the effectiveness of various accident prevention programmes. Personnel selection programmes that try to identify accident prone people are ineffective. Near miss accident reporting did not decrease accident frequency, but did result in a 56% decrease in accident severity in one company. The effectiveness of the International Safety Rating System (ISRS) varied, with some companies achieving a 22% decrease in accidents while other ISRS programmes resulted in no change. Poster campaigns also varied in their success, from 0 to 33%. For physically demanding jobs, exercise programmes can be effective in reducing strain injuries. Firefighters' injuries were reduced by 16% through an exercise programme.

Guastello (1993) found the most successful methods to reduce accidents were:

- comprehensive ergonomics
- technological interventions
- Behavioural modification programmes

Comprehensive ergonomics is 'comprehensive' because it includes a whole range of activities that require management commitment, worker involvement and emphasise the concept of a 'safety climate'. These activities include safe performance monitoring, hazard control, work groups, supervisors more accountable for safety, as well as improved ergonomic design. The average reduction in accident frequency was 50% with such programmes.

Technological interventions use robotics and facility redesign to remove hazards and eliminate human error. In logging, mechanisation is a recognised method of eliminating the majority of hazards (Laflamme & Cloutier, 1988). It should be promoted wherever possible.

Behavioural modification attempts to change behaviour through extensive training in proper safe behaviour. This is followed by periods of observation and feedback. Programmes often include goal setting and forms of reinforcement. Incentives should be directed at safe behaviour, not accidents as this leads to non-reporting. Guastello (1993) reported that behavioural modification has decreased accident frequency from 12 to 94%.

The second phase is convincing company personnel of the value of safety and what goals need to be achieved. Everybody needs to accept responsibility for safety, it should be part of their performance criteria the same way as production is. Before any decisions are made, one needs to ask will it have any detrimental effect on safety? Every operation must be examined, the operation might work, but can it operate in a safer way, can it be mechanised? To help increase safety awareness, safety should be first item on the agenda at any meeting, as well as regular feedback on safety performance and behaviour.

The third phase involves educating and training contractors in principles of safety management, and getting their input and involvement in safety. Finally, the workers should be trained because now the 'climate' should encourage safe behaviour. Training workers will not be effective unless the 'safety climate' encourages safe behaviour. Other

problems such as the high turnover, poor communication, and low job satisfaction should be addressed, to enable training to be effective.

There are a few basic principles recommended by Cohen, Smith and Anger (1979) which should be followed in any safety strategy. When training, always stress the learning of safe behaviour rather than the unlearning of unsafe behaviour. Always promote the benefits of safe behaviour and use reinforcement for encouragement. Positive reinforcers are generally more effective than negative ones. The best and cheapest form of reinforcement is immediate feedback. As mentioned earlier, goal setting is a very powerful technique for improving behaviour.

When trying to change attitudes, there are a number of useful methods to help persuade the audience. Many of the following techniques were recommended by Aherin, Murphy, and Westaby (1990).

- Use credible sources to sell the messages (trustworthy experts in the field).
- Sources who are liked and are similar to the audience are also more persuasive.
- Present information that is not totally different from present views.
- Present strong arguments.
- Increase perceived risk to a moderate level.
- Demonstrate how the new message will remove the risk.
- Informal face-to-face communication is superior to any media transmission.
- The spoken word has more persuasive impact than the written word.
- Repeat the persuasive campaigns.

To improve safety in forestry and logging is not an easy task. Currently, the logging and forest industry are taking many steps to improve safety. However, a greater investment of time and money is still required to achieve success. This report identifies a number of problem areas, that if addressed, will improve the level of safety in the industry.

REFERENCES

Accident Compensation Corporation (1994). *Injury prevention data analysis: Forestry Industry.* Rotorua, New Zealand: ACC.

Adams, D. (1993). Labour Movement in the Industry - One Regions Experience. *LIRO Report, 18,* (4).

Aherin, R.A., Murphy, D.J., & Westaby, J.D. (1990). *Changing Farm Worker Behavior: A literature review of injury control strategies.* Chicago: American Society of Agricultural Engineers.

Asma, F.E., Hilker, R.R.J., Shevlin, J.J., & Golden, R.G., (1980). Twenty-five years of rehabilitation of employees with drinking problems. *Journal of Occupational Medicine, 22(4),* 241-244.

Bird, F.E., & Germain, G.L. (1986). *Practical Loss Control Leadership.* International Loss Control Institute: Loganville, Georgia

Bradford,S., Isler, R., Kirk, P., & Parker, R. (1992). Conspicuous Colours For Loggers Safety Clothing. *LIRO Report, 17,* no.11.

Cox, S., & Cox, T. (1991) The structure of employee attitudes to safety: A european example. *Work and Stress, 5,* 93-106.

Crowe, M.P. (1986). Hardwood logging accidents and counter-measures for their reduction. *Australian Forestry, 49 (1),* 44-55.

Cryer, P.C., & Fleming, C. (1987). A review of work-related fatal injuries in New Zealand 1975-1984 - numbers, rates and trends. *NZ Medical Journal, 100,* 1-6.

Dedobbeleer, N, & Beland, F. (1991). A safety climate measure for construction sites. *Journal of Safety Research, 22,* 97-103.

Dunn, J.B. (1972) Subjective and objective risk distribution. A comparison and its implications for accident prevention. *Occupational Psychology, 46,* 183-187.

Forestry & Wood Industries Committee (1991). *Occupational safety and health in forestry. Report 3.* Geneva: International Labour Office.

Gaskin, J. (1988). Analysis of fatal logging accidents - 1968 to 1987. *LIRA Report, 13, (20).*

Gaskin, J. (1990). An ergonomic evaluation of two motor-manual delimbing techniques. *International Journal of Industrial Ergonomics, 5(3),* 211-218.

Gaskin, J., Smith, E., & Wilson, P. (1989). The New Zealand Logging Worker - A Profile. *LIRA Project Report, 44.*

Griffiths, D.K. (1985). Safety attitudes of management. *Ergonomics, 28,* 61-67.

Griffiths, R.W., & Rogers, R.W. (1979). Effects of fear-arousing components of driver education on students safety attitudes and simulator performance. *Journal of Educational Psychology, 4,* 501-506.

Grummitt, J (1990). Manpower motivation. In Manpower Management in Logging Proceedings, LIRO Seminar. June.

Guastello, S. (1993). Do we really know how well our occupational accident prevention programmes work? *Safety Science, 16,* 445-463.

Hale, A. R. & I. A. Glendon, (1987). *Individual behavior in the control of danger.* Elsevier, Amsterdam: Elsevier Science Publishers B.V.

Health and Safety in Employment Act (1992). Wellington, New Zealand: GP Publishers.

Howarth, C.I. (1988). The relationship between objective risk, subjective risk and behaviour. *Ergonomics, 31,* 527-535.

International Labour Organisation (1981). *Occupational safety and health problems in the timber industry. Third Tripartite Technical Meeting for the Timber Industry (Report no. 2).* Geneva: International Labour Organisation.

Kawachi, I., Marshall, S., Cryer, C., Wright, D., Laird, I., & Slappendel, C. (1991). The epidemiology of work-related injury among forestry workers in New Zealand - Results from a data-linkage study. Unpublished manuscript.

Kim, J.M. (1975). Multivariate analysis of ordinal variables. *American Journal of Sociology, 81,* 261-298.

Kirk, P., & Parker, R., (1992). Effect of Spiked Boots on Faller Safety, Productivity, and Workload. *LIRO Report, 17,* no.19.

Klen, T. (1988). Subjective and objective risk estimate in logging work. Paper presented at *International Conference on Ergonomics, Occupational Safety and Health and the Environment, Beijing,* October 24-28.

Kletz, T.A. (1993). Accident data - the need for a new look at the sort of data that are collected and analysed. *Safety Science, 16,* 407-416.

Kopardekar & Mital, (1994). The effect of different work-rest schedules on fatigue and performance of a simulated directory assistant's task. *Ergonomics,* Vol. 37 No. 10. October.

Krueger, G.P. (1991). Sustained miltary performance in continuous operations: combat fatigue, rest and sleep needs. In *Handbook of Military Psychology.* Chichester, England: John Wiley & Sons.

Laflamme, L., & Cloutier, E., (1988). Mechanisation and risk of occupational accidents in the logging industry. *Journal of Occupational Accidents, 10(3),* 191-198.

Mackworth, H.N. (1948). The breakdown of vigilance during prolonged visual search. *Quarterly Journal Experimental Psychology, 1,* 6-21.

Marshall, B., & Kelly, J. (1986). *Atlas of New Zealand Boundaries.* University of Auckland: Geography Department.

Melamed, S., Luz, J., Najenson, T., Jucha, E. & Green, M. (1989). Ergonomic stress levels, personal characteristics, accident occurrence and sickness absence among factory workers. *Ergonomics, 32,* 1101-1110.

Murphy, D. J. (1981). Farm safety attitudes and accident involvement. *Accident Analysis and Prevention, 13, 331-337.*

New Zealand Forest Owners Association (1993). *Occupational Safety and Health Strategy.* Wellington, New Zealand: NZFOA.

Occupational Safety and Health Service (1993). Eleven die in logging accidents. *Bush Bulletin, 69.*

Oppenheim, A.N.(1992). *Questionnaire design, interviewing, and attitude measurement.* New York: Pinter Publishers.

Parker, R. (1991). Loggers ranking of felling and trimming hazards. *LIRA Report, 16, (4).*

Parker, R. (1993a). Analaysis of Lost Time Accidents - 1992 Logging. *LIRO Report, 18, (12).*

Parker, R. (1993b). Lost Time Accidents in Forestry - 1991 and 1992. *LIRO Report, 18 (15).*

Parker, R., & Cossens, P. (1993). Stress and it's effect on Log maker performance. *LIRO/FIEA seminar 'Quality Issues in Processing and Harvesting'*, Rotorua.

Parker, R. & Kirk, P. (1994). The physiological workload of forest work. *LIRO Report, 19,* (in press).

Pettersson, B. (1981). Strategies and means to increase safety in forestry - an example from Sweden. *IUFRO World Congress Proceedings Division 3.*

Powell, A., & Vega, M. (1972). Correlates of Adult Locus of Control. *Psychological Reports, 30 (2),* 455-460.

Probine, M.C., Grayburn, A.W., & Cooper A.E. (1987). *Report of the review committee on education and training in the forest industry.* Wellington, New Zealand. Ministry of Forestry: unpublished report.

Rotter, J. B. (1966). Generalised expectancies for internal, versus external control of reinforcement. *Psychological Monographs General and Applied, 80,* (1) 1-28.

Sherry, P. (1991). Person-Environment Fit and Accident Prediction. *Journal of Business and Psychology, 5 (3),* 411-416.

Simonds, R.H., & Shafai-Sahrai, Y. (1977). Factors apparently affecting injury frequency in eleven matched pairs of companies. *Journal of Safety Research, 9 (3),* 120-127.

Slappendel, C., Laird, I., Kawachi, I., Marshall, S., & Cryer,C. (1993). Factors Affecting Work-Related Injury Among Forestry Workers: A Review. *Journal of Safety Research, 24,* 19-32.

Smith, M.J., Cohen, H.H., Cohen, A., and Cleveland R.J. (1978). Characteristics of Successful Safety Programs. *Journal of Safety Research, 10* (1), 5-15.

Tapp, L., Gaskin, J., & Wallace, K. (1990). Loggers assessment of risks in their work. *LIRO Report, 15,* 1.

Vayrynen, S., & Kononen, U. (1991). Short and long-term effects of a training programme on work postures in rehabilitees: A pilot study of loggers suffering from back troubles. *International Journal of Industrial Ergonomics, 7,* 103-109.

Waggenaar, W.A., Hudson, P.T., & Reason, J.T. (1990). Cognitive Failures and Accidents. *Applied Cognitive Psychology, 4,* 273-294.

Walters, V., & Haines T. (1988). Workers perceptions, knowledge and responses regarding occupational health and safety: A report on a Canadian study. *Social Science Medicine, 27 (11),* 1189-1196.

Wilson, P., Gaskin, J., & Smith, B. (1988). Job Satisfaction Among New Zealand Logging Workers. *LIRA Report, 13, (3).*

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Attitudes Towards Safety Questionnaire

The purpose of this questionnaire is to find out what your views to safety are and how these views are related to other items like training and education. The results will be used to try to improve safety in your job. The contents of this form are **completely confidential. Your contractor, supervisor and company <u>will not see your answers.</u>**

Please <u>circle</u> your answer or reply in the space provided.

Name? (optional) _____

(1) Age? (in years) _____

(2) Sex? Male
Female

(3) Race? NZ European
NZ Maori
Other (specify)_____

(4) How many days did you spend training with the following groups in 1992?

Please tick the appropriate boxes

	0	less than one	1 to 3	4 to 7	8 to 14	15 or more
(i) Your Boss?						
(ii) Another worker?						
(iii) Company Trainers?						
(iv) L&FITB?						
(v) Polytech?						
(vi) Other (specify)						

(5) Have you passed any FIRS Modules? Yes No

(6) Are you currently working towards or doing any:
(i) FIRS Modules Yes No
(ii) Polytech courses Yes No
(iii) Other (specify) _____

(7) How many years did you spend at High School?
0 1 2 3 4 5 6

(8) How many years of work experience do you have:
(i) In silviculture? _____
(ii) In logging? _____

(9) Do you have :	Yes	No	Don't know
(i) School Certificate?			
(ii) U.E ?			
(iii) H.S.C ?			
(iv) A Trade Certificate ?			
(v) A Diploma ?			
(vi) A Degree ?			
(vii) Other educational qualification? (specify)			

(10) What do you spend most of your time doing?

Felling	Trimming
Breaking out	Log making
Skidwork	Skidder Op.
Tractor Op.	Loader Op.
Hauler Op.	Job sharing (felling, skidwork, etc)

Other _____

(11) How long have you been doing the job above? (years) _____

(12) How long have you worked in this crew? (years) _____

(13) What time do you usually:
(i) Leave for work? _____
(ii) Arrive home? _____

(14) How long does it take you to travel to work (one way)? _____

(15) How often do you work in logging on weekends? (please circle)

Never | few times a year | once a month | 2 or 3 times a month | every weekend

(16) How often do the following people talk to you about safety?	Daily	Weekly	Monthly	Yearly	Never
(i) Your boss					
(ii) Your supervisor					
(iii) The bush inspector					
(iv) A trainer					

(17) How annoying would you rate the following in your job?

	Does not annoy me at all	Not too bad	Slightly annoying	Annoying	Very annoying
(i) Noise					
(ii) Heat					
(iii) Cold					
(iv) Weather (rain, wind)					
(v) Dust					
(vi) Mud					
(vii) Fumes (eg. smoke)					
(viii) Weeds (gorse, blackberry)					
(ix) Vibration					

(18) How much do you think the following items help reduce injuries?

	No help at all	Very little help	Does help a bit	Pretty helpful	Very helpful
(i) Helmets					
(ii) Visors					
(iii) Chaps					
(iv) Chainsaw trousers					
(v) Earmuffs					
(vi) Steel capped boots					
(vii) Spiked boots					
(viii) Cut resistant rubber boots					
(ix) High visibility gear					
(x) Chainsaw mitt					
(xi) Seatbelts					
(xii) Chainbrake					

(19) Have you heard of the Health and Safety in Employment Act?
No Yes - Do you understand your responsibilities under the new act?
(a) No
(b) I'm not sure
(c) Yes

(20) Have you seen your gangs safety policy?
No Yes - Do you understand it?
(a) No
(b) I'm not sure
(c) Yes

(21) Have you seen the company safety policy?
No Yes - Do you understand it?
(a) No
(b) I'm not sure
(c) Yes

(22) Have you seen the Forest Owners Association safety policy?
No Yes - Do you understand it?
(a) No
(b) I'm not sure
(c) Yes

(23) Please circle the number of people you think were killed in logging accidents in NZ for 1992. (Guess if not sure)
1 3 5 7 9 11 13

(24) How many logging accidents (resulting in time off work) do you think were reported in NZ for 1992?
(a) 50 to 99
(b) 100 to 149
(c) 150 to 199
(d) 200 to 249
(e) 250 to 300

(25) How strict are each of the following in enforcing safety?

	Very strict	Strict	Fairly strict	A little strict	Not strict at all
(i) Your boss					
(ii) Your supervisor					
(iii) The bush inspector					
(iv) The trainers					

Could you please read the following statements then tick the box to show whether you agree or disagree with the statement.

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
(26) Working in logging is very hard physical work.					
(27) Working in logging you need to keep your mind on the job.					
(28) My work can be very stressful at times.					
(29) I have control over the speed at which I work.					
(30) It is important to wear safety equipment at all times while at work.					
(31) I would wear the safety gear I wear now even if it was not compulsory.					
(32) There would be less accidents if there was no protective gear because people would be more careful.					
(33) Most of the safety gear is <u>useless</u> at preventing injuries.					
(34) The <u>boss</u> checks that we wear the required gear when working.					
(35) The <u>supervisor</u> checks that we wear the required gear when working.					
(36) Logging is very dangerous work.					
(37) There is nothing in the job that forces you to take risks.					
(38) I enjoy taking chances.					
(39) Taking risks is part of logging.					
(40) I am more likely to have an accident at home than at work.					
(41) The <u>boss</u> handles safety problems well.					
(42) The <u>supervisor</u> handles safety problems well.					
(43) Production pressure has no effect on safety.					

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
(44) My on-the-job safety training was excellent.					
(45) Safety programmes are very important.					
(46) All injuries are preventable.					
(47) Getting injured is usually just bad luck.					
(48) I'm too busy to worry about safety.					
(49) An accident won't happen to me.					
(50) There is no point in reporting a near miss.					
(51) Even experienced people need to be reminded about safety.					
(52) Accidents happen because workers are too careless.					
(53) I feel that I have little control over the things that happen to me at work.					
(54) If I worried about safety all the time I would not get my job done.					
(55) Good drivers don't need to wear seatbelts.					
(56) Acting safely is respected by my workmates.					
(57) Everybody shares the responsibility for safety.					
(58) All accidents can be avoided.					
(59) I can look after my own personal safety.					
(60) I have a lot of involvement in safety decisions.					
(61) People who do not follow safety rules endanger themselves and their workmates.					
(62) There is conflict between safety and other job demands.					
(63) What happens to me at work is my own doing.					

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
(64) I would consider leaving the job because of poor safety.					
(65) The logging industry does all that it possibly can to ensure that workers are safe.					
(66) I know how to approach the boss about my safety concerns.					

	Yes	No	Don't know
(67) Are you aware of any safety programmes operating in your forest (eg. safety meetings, safety incentive schemes)?			
(68) If yes, do you think current safety programmes are very effective?			
(69) Do you have regular safety meetings?			
(70) Does your <u>boss</u> set safety goals?			
(71) Does your <u>supervisor</u> set safety goals?			

(72) Safety is more important than profits, production and quality.

	Yes	No	Don't know
(i) Do you think your <u>boss</u> really believes this?			
(ii) Do you think your <u>supervisor</u> really believes this?			
(iii) Do you think your <u>workmates</u> really believe this?			

(73) Which statement below (1,2 or 3) best describes how much your boss cares about your safety? _____

(1) Does as much as possible to make the job safe.
(2) Is concerned about safety but could be doing more to make the job safe.
(3) Is really only interested in getting the job done as fast and cheaply as possible.

(74) Which of the above statements (1,2 or 3) best describes how much your supervisor cares about your safety? _____

(75) Overall, how would you rate the following in their attitude towards safety?

	Doesn't care	Bit slack	Alright	Good	Excellent
(i) Your boss					
(ii) Your supervisor					
(iii) The trainers					
(iv) Your workmates					
(v) The bush inspector					
(vi) Your own					

(76) How do you think safety could be improved and accidents reduced in your job?

_____

_____

_____

_____

_____

_____

(77) Have you ever suffered from back pain?
No Yes

(78) Have you had an accident at work in the last five years which resulted in an injury that caused you to take more than a day off work?
No
Yes - Did this accident happen last year (1992).
No
Yes - How many lost time injuries did you have last year?
1 2 3 4

Please complete this page only if you had an accident last year.

(79) What job were you doing at the time of the accident? (Please describe the worst accident if you had more than one) _____

(80) How did the accident happen?

_____

_____

_____

(81) How long were you off work? (in days) _____

(82) Did you go to hospital?
No Yes - How many days did you spend in hospital?_____

(83) Did any of the following talk to you about the accident? (please circle)
Contractor Supervisor Bush Inspector Trainer
Other (specify) _____

(84) Can you remember the advice that you were given from anybody?

_____

_____

_____

_____

(85) Did anyone come back later to check that the recommendations or advice was followed?
Yes No Don't know

(86) What do you think was the main cause of the accident?

_____

_____

_____

_____

(87) After the accident did the gang get together to see how it happened and how it can be avoided?
Yes No Don't know

(88) Did anybody assist your recovery and entry back to the workforce?
Yes No Don't know

(89) How happy were you with the investigation that took place after your accident and the advice given?

Very unhappy	unhappy		happy	Very happy
1	2	3	4	5

Attitudes Towards Safety Questionnaire

The purpose of this questionnaire is to examine the attitudes you and your company have towards safety. These will be compared to contractors and workers. It also asks information on current safety procedures. The effect of these attitudes and programmes on accidents will be examined. **All information will remain completely confidential.**

Please circle your answer or reply in the space provided.

Name? _____

(1) Age? (in years) _____

(2) Sex? Male
Female

(3) Race? NZ European
NZ Maori
Other (specify)_____

(4) How many years work experience do you have:
(i) In forestry? _____
(ii) In logging? _____

(5) How many years did you spend at High School?
0 1 2 3 4 5 6

(6) Do you have :	Yes	No
(i) School Certificate?		
(ii) U.E ?		
(iii) H.S.C ?		
(iv) A Trade Certificate ?		
(v) A Diploma ?		
(vi) A Degree ?		
(vii) Other educational qualification? (specify)		

(7) Which statement below (1,2 or 3) best describes how much you care about worker safety? _____

(1) Do as much as possible to make the job safe.
(2) Concerned about safety but could do more to make the job safe.
(3) Really only interested in getting the job done as fast and cheaply as possible.

(8) Which of the above statements (1,2 or 3) best describes how much your company cares about worker safety? _____

(9) How often do each of the following talk to workers and contractors about safety?

	Daily	Weekly	Monthly	Yearly	Never
(i) Your supervisors					
(ii) Your trainers					
(iii) Yourself					

Could you please read the following statements then tick the box to show whether you agree or disagree with the statement.

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
(10) Safety is a line management responsibility.					
(11) Safety is a condition of employment.					
(12) Management is responsible for the safety of its employees.					
(13) Working longer hours increases the chance of an accident.					
(14) Working in forestry is very hard physical work.					
(15) Working in forestry you need to keep your mind on the job.					
(16) Forestry work can be very stressful at times.					

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
(17) Workers have control over the speed at which they work.					
(18) It is important to wear safety equipment at all times while at work.					
(19) There would be less accidents if there was no protective gear because people would be more careful.					
(20) Most of the safety gear is useless at preventing injuries.					
(21) The supervisor checks that workers wear the required gear when working.					
(22) Working in forestry is very dangerous.					
(23) There is nothing in the job that forces. workers to take risks.					
(24) The company handles safety problems well.					
(25) Workers are more likely to have an accident at home than at work.					
(26) Taking risks is part of logging.					
(27) I handle safety problems well.					
(28) Production pressure has no effect on safety.					
(29) Safety programmes are very important.					
(30) All injuries are preventable.					
(31) Getting injured is usually just bad luck.					
(32) I'm too busy to worry about safety.					
(33) There is no point in reporting a near miss.					
(34) Even experienced people need to be reminded about safety.					
(35) Accidents happen because workers are too careless.					
(36) If I worried about safety all the time I would not get my job done.					
(37) Good drivers don't need to wear seatbelts.					

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
(38) Acting safely is respected by workers.					
(39) Everybody shares the responsibility for safety.					
(40) All accidents can be avoided.					
(41) I have a lot of involvement in safety decisions.					
(42) People who do not follow safety rules endanger themselves and their workmates					
(43) There is conflict between safety and other job demands.					
(44) Workers would consider leaving the job because of poor safety					
(45) The forest industry does all that it possibly can to ensure that workers are safe.					
(46) Supervisors know how to approach their managers about their safety concerns.					

	Yes	No	Don't know
(47) Do you have regular safety meetings?			
(48) Does your company conduct safety audits?			
(49) Are safety and health rules understood by all workers?			
(50) Do you have Material Safety Data Sheets for all hazardous products?			
(51) Does your company have an emergency plan established in the forest?			
(52) Do you get contractors to practice emergency drills?			
(53) Does the company set safety goals?			
(54) Who has input in setting company safety goals? (please specify)			

(55) Have you heard of the Health and Safety in Employment Act?
No Yes - Do you understand your responsibilities under the new act?
(a) No
(b) I'm not sure
(c) Yes

(56) Do your contractors have their own safety policy?
(a) No
(b) I'm not sure
(c) Yes

(57) Have you seen the company safety policy?
No Yes - Do you understand it?
(a) No
(b) I'm not sure
(c) Yes

(58) Have your contractors seen the company safety policy?
No Yes - Do they understand it?
(a) No
(b) I'm not sure
(c) Yes

(59) Have the workers seen the company safety policy?
No Yes - Do they understand it?
(a) No
(b) I'm not sure
(c) Yes

(60) Were contractors and workers involved in constructing the safety policy?
No Yes

(61) Do you follow the Forest Owners Association safety policy?
No Yes - Have the contractors seen it?
(a) No
(b) I'm not sure
(c) Yes

(62) Who is responsible for conducting an accident investigation?

_____

(63) What training have investigators completed?

_____

_____

(64) What information is collected after an accident?

_____
_____
_____
_____
_____

(65) What is considered to be a near miss? Do contractors report these?

_____
_____
_____
_____

(66) What people in the company receive an accident report?

_____
_____

(67) Is there any follow up procedures to check whether recommendations have been carried out? What are they?

_____
_____
_____
_____

(68) Does anybody evaluate/assess the company trainers?
No Yes - Who? _____

(69) Please circle the number of people you think were killed in the NZ forest industry for 1992. (Guess if not sure)
1 3 5 7 9 11 13

(70) How many forestry accidents resulting in time off work do you think occurred in NZ for 1992?
(a) 50 to 99
(b) 100 to 149
(c) 150 to 199
(d) 200 to 249
(e) 250 to 300

(71) How many lost time accidents occurred in your company in 1992?_____

(72) Do you have a self-inspection programme to identify hazards (including all health hazards) in the forest?
No Yes - Who does this? _____

(73) How are these hazards being reduced or eliminated?

(74) What safety programmes (not listed above) do you currently have in place?

(75) Are your workers aware of these?
No Yes

(76) What do you think is the underlying cause(s) of most accidents?

(77) How do you think safety could be improved and accidents reduced in the forest?

(78) How often do the following people talk to you about safety issues?

	Daily	Weekly	Monthly	Yearly	Never
(i) Other managers					
(ii) Your supervisors					
(iii) The bush inspector					
(iv) Your Trainers					

(79) How annoying do you think the following would be to forestry workers?

	Does not annoy me at all	Not too bad	Slightly annoying	Annoying	Very annoying
(i) Noise					
(ii) Heat					
(iii) Cold					
(iv) Weather (rain, wind)					
(v) Dust					
(vi) Mud					
(vii) Fumes (eg. smoke)					
(viii) Weeds (gorse, blackberry)					
(ix) Vibration					

(80) How much do you think the following items help reduce injuries?

	No help at all	Very little help	Does help a bit	Pretty helpful	Very helpful
(i) Helmets					
(ii) Visors					
(iii) Chaps					
(iv) Chainsaw trousers					
(v) Earmuffs					
(vi) Steel capped boots					
(vii) Spiked boots					
(viii) Cut resistant rubber boots					
(ix) High visibility gear					
(x) Chainsaw mitt					
(xi) Seatbelts					
(xii) Chainbrake					

(81) Safety is more important than profits, production and quality.

	Yes	No	Don't know
(i) Do you really believe this?			
(ii) Does your company really believe this?			
(iii) Do the workers believe that the company really believes this?			

(82) Overall, how would you rate the following in their attitude towards safety?

	Doesn't care	Bit slack	Alright	Good	Excellent
(i) Your company					
(ii) Your supervisors					
(iii) Your trainers					
(iv) Your workers					
(v) Your own					