PROJECT REPORT

A Study of the Psychological Climate of the Logging Industry - How it Affects Safety Climate, Organisational Commitment, Intentions to Turnover, Accident and Turnover Rates

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A STUDY OF THE PSYCHOLOGICAL CLIMATE OF THE LOGGING INDUSTRY

- HOW IT AFFECTS SAFETY CLIMATE, ORGANISATIONAL COMMITMENT, INTENTIONS TO TURNOVER, ACCIDENT AND TURNOVER RATES

Project Report 72   1998

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September, 1998

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EXECUTIVE SUMMARY

New Zealand's logging industry is one of the country's largest exporting industries. With increased global competition and demands, work environments such as the logging industry can become intensified, resulting in problems such as high accident and turnover rates. Much research has been completed on accident and turnover rates, yet there has been no apparent reduction in accident rates. New approaches are therefore necessary to identify possible reasons for such problems. Psychologically based investigations have been found to be beneficial in organisations exhibiting similar problems, by locating problems existing within an individual's perceptions. The individuals in the workforce make an organisation what it is. Finding out what they think and feel about their work environment, and the relationships between other members, has been proven to be an accurate way of identifying both what is happening within the workforce, and why certain factors are occurring. Therefore the present study focused on the contractors and crew members thoughts on their work environment, and how these thoughts can lead to accidents and turnover. The subjects were six crews (four corporate crews and two woodlot crews) including six contractors and 67 crew members from the Bay of Plenty and Hawke's Bay areas.

Results showed that psychological climate and other work-related variables do have an effect on accident and turnover rates. Psychological climate was also shown to affect other work factors previously shown to impact on these problems. In general, the psychological climate of the logging industry lacks certain qualities that very successful organisations tend to exhibit. The safety climate of the logging industry could be interpreted as insufficient, in an industry known for hazards. Commitment to safety was sufficient within the logging industry although the development of a committed workforce will require greater loyalty. Intentions to turnover were also found to be moderate.

RECOMMENDATIONS

Contractors perceptions of role ambiguity must be lowered. The lack of work group friendliness and warmth, especially for crew members, also needs attention. Leader support and facilitation was found to be adequate.

Forest companies must take responsibility for creating a more positive and effective safety climate. Williamson, et. al. (1997) concluded that safety interventions can result in changes in attitudes and perceptions about safety. Therefore, the knowledge of safety perceptions within the logging industry which have been gained from this study may form the basis of well needed changes.

With the turnover problems experienced by the logging industry, enhanced crew commitment and lowered intention to turnover should take priority. Mowday et. al. (1982) and Parasuraman (1982) suggest that to lower the levels of intentions to turnover, one must heighten the perceptions of commitment. More recommendations can be found throughout the text.

KEY FINDINGS

- Both contractors and crew members perceived their performance was affected by pressures from supervisors and contractors, respectively.
- Both crew members and contractors, perceived a lack of control over their own, and other members safety
- Contractors felt that the more supervisors praised them on safe behaviour, and the more realistic the safety procedures, the more safely they would work
- Working unsafely is sometimes perceived by crew members and contractors as being the result of a lack of knowledge of the task, the task needing to be completed quickly, and the correct equipment not being provided or not working
- The more demands felt from other tasks by crew members, the more circumstances for unsafe behaviours are seen to occur
- The higher the co-operation a crew member feels from their crew, the greater the importance they will place on safety, as well as feeling more in control over safety
- The more crew members perceived encouragement of team work from their contractor, the more they perceived workplace conditions as being safe, while also feeling more commitment from the leaders to safety
- Contractors perceived their supervisors as having little commitment towards safety.
- The contractors and crew members commitment to their forestry organisation/crew was rated as being below average to average.
- The more crew members and contractors felt affected by pressures from conflicting demands, the more a crew member/contractor intended to quit their crew/forestry organisation.
- The less variety and challenge in crew members' jobs, the more a crew member intended to quit.
- The less support a contractor had from their supervisor, and the less trust they had in their supervisor, the higher the intentions to quit the forestry organisation
- The more demands a contractor perceived, the higher the rate of turnover existed within their crews
- The less the contractor perceived the importance of safety and control over safety, the more likely the crew members were to have accidents.

INTRODUCTION

Psychological Factors of the Logging Industry - Why study them?

Psychological aspects of forestry work and the psychological characteristics of the industry's workforce are starting to shed light on accidents within the logging industry (Slappendel, Laird, Kawachi, Marshall, & Cryer, 1993), and turnover levels within other industries (Riggar, et al.,1987; Parasuraman & Nachman, 1987). Taking measures to determine perceptions of individual crew members could therefore be seen as a positive step in creating a better work environment within the logging industry.

Except for Gibson (1994) and Sullman (1998) few have studied psychological factors of the New Zealand logging industry. Psychological climate (PC) has been found to help determine why problems are occuring within organisations and industries. This report will therefore focus on the psychological factors within the logging industry that makes up its psychological climate.

Psychological Climate

Understanding the psychological climate which exists in the logging industry, may highlight alternative views on the sources of the problems, raising questions and challenging traditional assumptions.

Psychological climate (PC) is defined as:

" sets of perceptually based descriptions of relevant organisational features, events, and processes" (James & Jones, 1974; Jones & James, 1979).

In other words, individuals within organisations interpret organisational policies, practices and procedures in psychologically meaningful terms. Psychological climate, once developed has been shown to affect motives, behaviours, perceptions, and abilities (Forehand & Gilmer, 1964; Lawler et al., 1974).

Knowledge of PC (see Appendix A for full definitions of PC variables) has proven useful in forecasting potential problems within an organisation. Problems within the logging industry are primarily, high accident and turnover rates. A study on sports coaches in America (Riggar et al., 1987), found that the PC variables of role ambiguity and role conflict were associated with high *turnover rates* among the sports coaches. In another study of transit operators (Guastello, 1991), found that *injuries* became more frequent when operators experienced such factors as the PC variables included in role stress, from leaders and team members.

According to Field and Abelson (1982), psychological climate can also affect job behaviours/perceptions. The job behaviours/perceptions (Appendix B), hypothesised as being affected by the climate of the logging industry were safety climate, organisational commitment, and intentions to turnover.

Job Behaviours/Perceptions

Safety climate is defined as:

"the organisational member's perceptions of safety within their workplace"

Knowledge of safety climate has been found to be very important due to the direct influence on accidents (Niskanen, 1994; Zohar, 1980). Williamson, Feyer, Cairns, and Biancotti, (1997) stated that explanations of safety climate factors are essential to safety, and for developing

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interventions to improve safety. However, safety climate is a climate within itself. The present study uses this climate as a job (Minwir, 1992).

Research into the relationships between PC and safety climate is non-existent. However, several researchers have discussed the effects of safety climate on accidents within the work place. Hofmann, Jacobs, and Landy (1995) found that subordinates with supervisors who never mentioned the issue of safety, developed the perception that safety was unimportant. The effect of this is that they did not attempt safe behaviour.
reduction of accident related lost days per annum in several gas companies, from 4000 days to 21 days, because of top management's commitment and efforts towards safety.

Organisational commitment is the second job behaviour/perception integrated into the present report. Robertson and Tang (1995) identified through research and theorising that organisational commitment is a very important work-related perception. Organisational commitment is:

"a person's affective reactions to characteristics of his/her employing organisation" (Cook & Wall, 1980; p. 40)

Organisational literature demonstrates that low commitment is significantly and negatively associated with turnover and, to a lesser extent, other withdrawal behaviours such as decreased performance and increased absenteeism (Reichers, 1985). Alternatively, Mowday, Porter, and Steers (1982) and Rosenhotz (1989) found that increased commitment may lead to greater job effort and lower turnover rates.

Organisational commitment has also been found to be affected by PC variables. Morris

behaviour/perception because it has been differentiated from other climates, as have other related concepts (Al-Shammair & and Koch (1979), found that role conflict was inversely related to commitment. Parasuraman and Nachman (1987) reported a positive relationship between leader consideration or support, levels of role stresses, and commitment. Cook et. al. (1980) found that trust and faith in management correlated substantially with organisational commitment. Another study by Luthans, Wahl and Steinhaus (1992) found that a supportive climate created higher levels of commitment towards an organisation.

The third job behaviour/perception contained in this report is intentions to turnover. This variable can be referred to as:

"an individuals' perception of the probability of staying in an organisation or terminating employment."

Parasuraman (1982) found that behavioural intentions like intentions to turnover, were the most likely predictor of actual turnover. Furthermore, it was found that these behavioural intentions are created by PC variables such as work stress, and the individual's evaluations of the employing organisation.

Study Objectives

Possible interactions and relationships were predicted to be found between psychological climate, the job behaviours/perceptions, and adverse activities like high accidents and turnover rates. The main objectives for the present study were therefore:

- To determine the psychological climate of the logging industry.
- To determine the safety climate of the

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logging industry.

- To determine the organisational commitment within the logging industry.
- To determine the intentions to turnover of the members within the logging industry.
- To learn the relationships between psychological climate, and the job behaviours/perceptions; safety climate, organisational commitment, and intentions to turnover.
- To learn the effects of psychological climate on accident and turnover rates.
- To learn the effects of safety climate on accident rates.
- To learn the effects of organisational commitment and intentions to turnover on turnover rates.

ACKNOWLEDGMENTS

METHODOLOGY

Design

Data was collected using a questionnaire developed specifically for the purpose of this study. The questionnaire contained questions on demographic data, psychological climate perceptions (Psychological Climate Questionnaire by Jones & James, 1979), safety climate perceptions (Five Factor Solution of Safety Climate by Williamson, Feyer, Cairns, & Biancotti, 1997), crew/organisational commitment (organisational commitment section of a work attitude study by Cook &

Wall, 1980), intentions to turnover (intentions to turnover section of the Michigan Organisational Assessment Questionnaire), and the accident and turnover rates within each crew. Changes to the wording of some questionnaires was necessary to accommodate reading levels, time constraints, and terminology used in the logging industry. Rotter (1974; cited in Gibson, 1994) and Lefcourt (1992) noted that changes to scales are necessary to provide valid measurement in specific populations. The contractors and crew members had different versions of the questionnaire to allow for a wider range of knowledge. The majority of questions were set up on a 5-point Likert scale.

To ensure the requirements and objectives of the study could be met by the questionnaire, a pilot test was conducted on one crew. Questions and their layout, and understanding of questions by the respondents needed to be checked before the main data collection commenced. Since the pilot test revealed that the time taken to complete the questionnaire was excessive, the length of the questionnaire was reduced. Several other changes were made to help make questions easily understood.

Sample

Data was collected from 6 contractors and 67 crew members in September of 1997. Two companies were selected on the basis of providing two different crew types; corporate crews and woodlot crews. Corporate crews are based in large forests, with long-term contracts. Woodlot crews are based in small forests, usually located on farms, with shorter-term contracts. Fletcher Challenge Forests Limited (Bay of Plenty) and Carter Holt Harvey Forests Limited (Hawkes Bay) provided the corporate crews and woodlot crews, respectively. There were four corporate crews (four contractors

and fifty nine crew members) and two woodlot crews (two contractors and eight crew members) in this study. The crews used in this study were located through their respective forestry organisations. All individual contractors were contacted by telephone and asked to participate in the study. All contractors agreed to the participation of themselves and their crews in the study.

Procedure
Every potential subject was invited to read an information sheet and asked if they had any questions. They were all told of the objectives for the study, and informed of confidentiality, the right to refuse to answer any questions, withdraw at any time, to contact the researcher with any questions, and if needed, to obtain the results of the study. Before completing the questionnaire, all subjects were familiarised with the correct procedure to be adopted. All members of each of the six crews visited, participated in the study.

The questionnaire took each person approximately 10-30 minutes to complete. The researcher was available to answer any questions before, after, and while the questionnaire was being filled out.

Data Analysis
The SAS statistical package was used to examine data and relationships among the variables. First, the variables were screened for missing data. This revealed that a small number of the subjects had not answered some items in the questionnaire. Items not answered never exceeded 5% of the total items answered, and it was therefore decided that deleting cases was an undesirable option. Because of the sample size, it was decided to maximise the available data by taking a mean total based on the number of items answered. The small sample size did however, effect the

type of analysis chosen for the present study. No discriminant/regression analysis was able to be performed on the present study's variables because accident and turnover rates were at crew level only. This meant that effectively, only six observations would be fitted into a model, too few for a model involving any more than one or two variables.

The relationships between demographic information and PC variables were therefore examined via an analysis of variance (Bonferroni (Dunn) t-tests). The relationships between PC variables, job behaviour/perception variables, and accident and turnover rates were examined via analysis of variance and correlations (Pearson r's). In all instances where t-tests were performed, an F test of sample variances was carried out for each comparison.

RESULTS AND DISCUSSION

DEMOGRAPHIC INFORMATION

Contractor Characteristics

All of the contractors were male, and had varying numbers of years in high school (mean = 3years), years within the logging industry (mean = 10years), and years in charge of their respective crews (mean = 9years). The contractors had also worked for varying numbers of crews (mean = 4crews).

Ethnicity

One hundred percent of woodlot contractors were New Zealand Europeans. Corporate contractors however, were made up of 50% New Zealand European, and 25% New Zealand Maori and other ethnicity (Figure 1).

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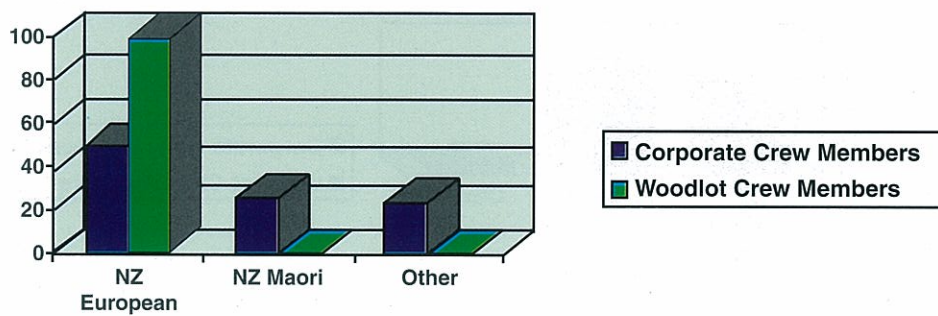
Figure 1 - Ethnicity of Contractors

Crew Member Characteristics

Age

Corporate crews had a higher level, or 46%, of younger members (15 to 24 years), while woodlot crew members' ages were more widely spread (Figure 2). Woodlot crews also had a large amount of older members (38% were over 40).
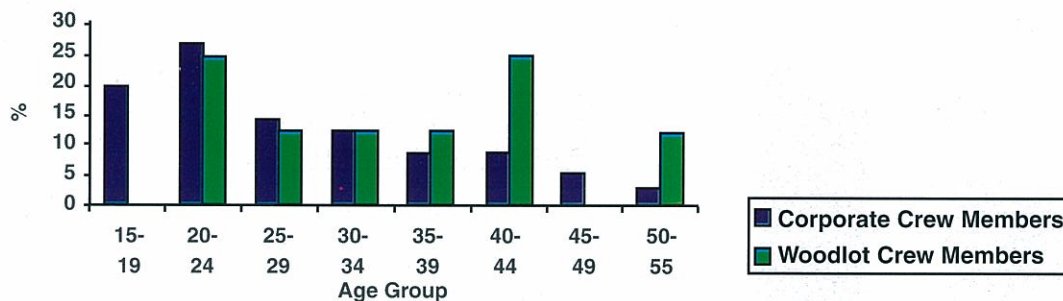
Gender

The sample consisted of 61 males (91%) and 6 females (9%). Corporate crews had 10% female members, while woodlot crews contained 100% males.

Ethnicity

The majority of corporate crews were made up of New Zealand Maori (63%). Woodlot crews contained half New Zealand Maori and half New Zealand European (Figure 3). Only corporate crew members classed themselves as other (5%).

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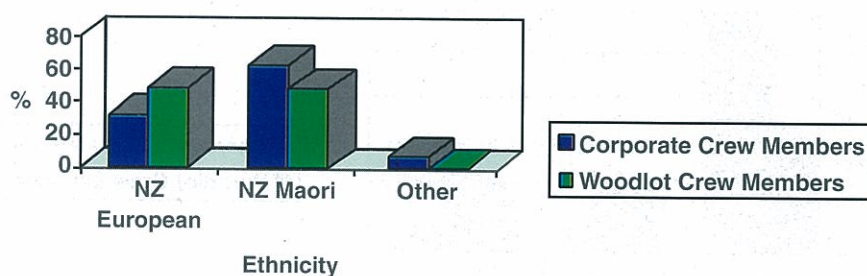
Figure 3 - Ethnicity of crew members

High School Education

No crew members within woodlot crews had spent any longer than five years in secondary education. Forty seven percent of corporate crew members, and 25% of the woodlot crew members had spent three years in high school. However, corporate crews had members who had spent only one year at high school (6%), and 21% for four years, and 18% for five years.

Length of Time within the Present Crew

The majority of crew members (84%) had only been in their crews for 1 month to 5 years (Figure 5). Corporate crews however, had members who had been in their crew for over 16 years (3%).
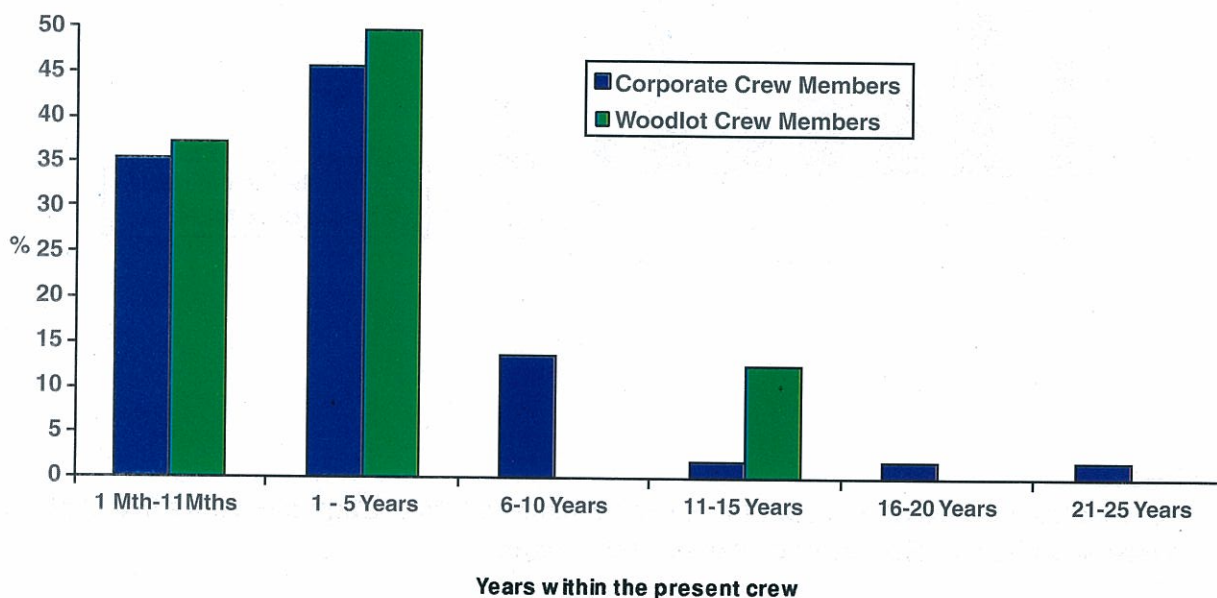
Figure 4 - Crew member's length of time within present crew

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Length of Time within the Logging Industry
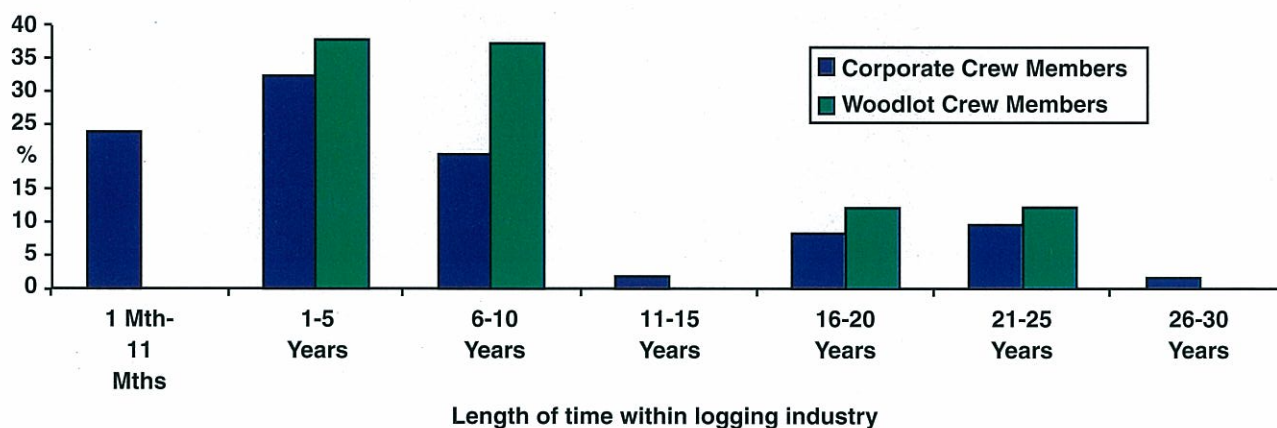
Figure 5 - Crew members' length of time within logging industry

Most of the crew members had been in the logging industry less than 10 years (76% of the total crew member population). Corporate crews had 23% of members who had been employed within the logging industry for one to eleven months. Woodlot crews had more members who had spent longer within the logging industry (26% had been in the logging industry for over 16 years).

Number of Crews Worked for
Most (59%) of the corporate crew members had worked for one or two crews, and the majority (75%) of woodlot crew members had worked for one to five crews (75%). However, 5% of corporate crew members had worked for nine to eleven crews.

Correct FIRS Modules for Present Task
All crew members were asked whether they had the correct FIRS module for the task they were doing at the time of the study. Twenty three percent of corporate crew members and 18% of woodlot crew members did not have the correct FIRS modules for their task.

Future Intentions
Nine percent of all crew members did not

want to be in the logging industry in one year. When asked whether they wanted to be in the logging industry in five years, 36% answered no. When observing the crew/organisation types, there were varying results (Figure 6).

There was a definite rise in predictions of individual members leaving the logging industry from within one year to within five years. The majority of both corporate and woodlot crew members predicted that they would stay within the logging industry for more than five years. Woodlot crew members had greater intentions of staying within the logging industry than did corporate crew members.

Turnover Rates of Subjects
All the contractors were asked how many crew members had left their crew in the past year. The turnover rates (see Figure 7) show that corporate crew members (14% of their crew members had left in the past year) have slightly greater turnover rates within their crews than woodlot crews (13% of their crew members had left in the past year).
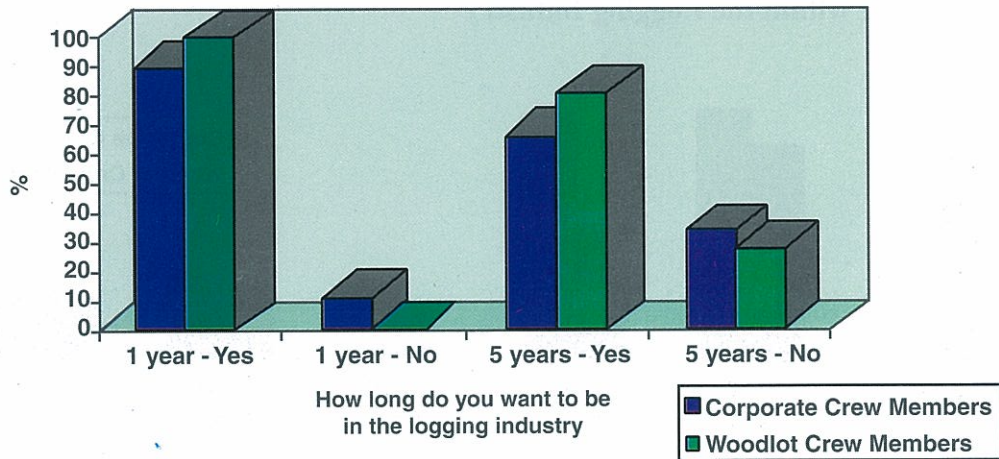
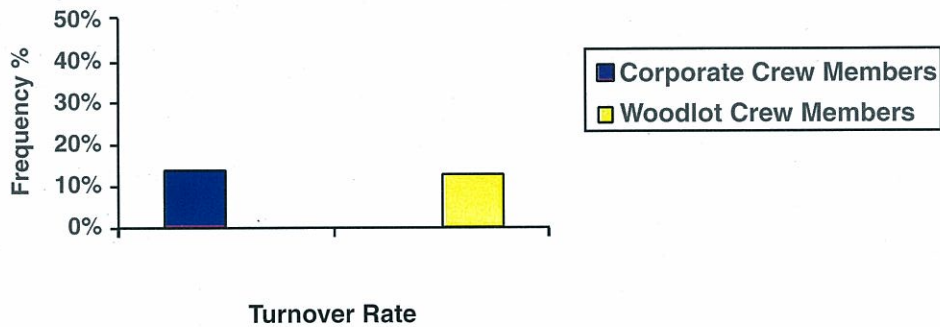*Figure 6 - Future intentions of staying within the logging industry*

Figure 7 - Turnover rates of crew members

Accident Rates of Subjects

Each crew member was asked how many accidents they had experienced in the previous year. The length of time each crew member had off due to injury ranged from one day to two weeks.

Figure 8 - Accident rates of crew members over the past year

Psychological Climate Perceptions

The following sections of results (PC perceptions, Safety Climate perceptions, Organisational Commitment perceptions and Intentions to Turnover sections) all contain results on the item/answer averages. Item averages are the total of all answers given by subjects divided by the total number of subjects. The scale for item averages ranges from 1 to 5. Where 1 is the lowest perception of the variable, and 5 is the greatest perception of the variable. For example, if the item average for crew members perceptions of happiness is 2, they are not very happy.

Appendix A contains definitions of the psychological climate variables.

As all of the following results found no significant differences between crew/organisation types, all data will be presented as separate subject groups, but discussed generally as contractor and crew members.

Role Ambiguity

Item or question averages illustrated that crew members perceived little role ambiguity. Contractors, on the other hand, perceived medium to high role ambiguity, especially corporate contractors (Figure 9).

Contractors believed that their roles were being confused with other jobs and tasks from the forestry organisations

Overall, contractors perceived much more ambiguity within their roles than did crew members. Obviously, contractors felt there was a high level of confusion because of the demands placed on them by other jobs and tasks. This seems logical as contractors carry out many roles within one day. They are a worker, leader, and business manager. Rizzo, House and Lirtzman (1970) stated

that role stress like ambiguity, can cause poor performance and job dissatisfaction. Action must be taken by the forest companies and contractors to create a more structured and defined work role.

Role Conflict

Contractors perceived only slightly greater pressures than crew from conflicting behaviours that affect their job performance (Figure 10). Although contractors and crew members felt medium conflict within their roles, this level of role stress can still cause poor performance and job dissatisfaction (Rizzo et. al., 1970).
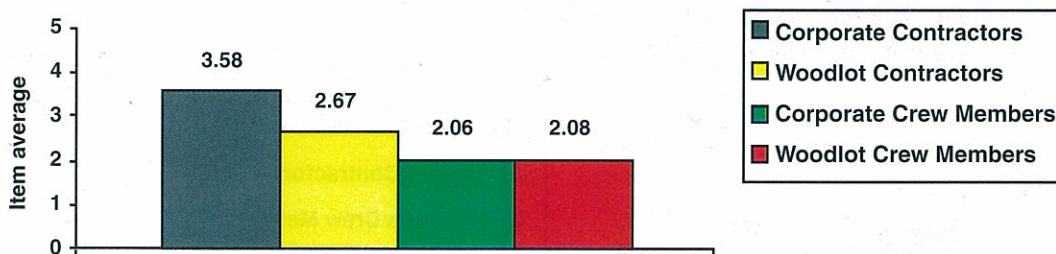
Figure 9 - Item averages of role ambiguity perceptions
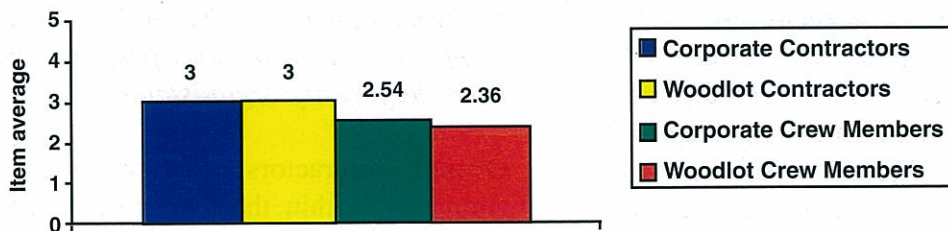
Figure 10 - Role conflict perceived by subjects

Both contractors and crew members perceived that their performance was affected by pressures from supervisors and contractors, respectively

Role conflict has been found to be a good predictor of adverse activities like accidents and turnover (Billingsley et. al., 1992). Whether these adverse activities are affected by role conflict is a question yet to be discussed, but no matter what, conflict perceived by members can only break down an organisation.

Job Challenge and Variety

Contractors percieved higher challenge and variety within their job than did crew (Figure 11). This may refelect the the high rate of ambiguity felt about their jobs. Higher job variety and challenge perceived by contractors suggests that contractors are more likely to be satisfied within their roles than crew are members (Gerhart, 1987; Baron & Greenberg, 1989). Contractors perceived higher variety and challenge within their jobs, than did crew members

Crew members still perceived a medium level of variety and challenge within their jobs. However, if one wants happy and satisfied crew members, one must make ways to provide more variety and challenge within their roles.

Work Group Co-Operation

Figure 12 illustrates that contractors perceived average co-operation from supervisors of the forestry organisation. However, both crew members and contractors perceived below average co-operation from crews and forestry organisations, respectively. These results imply co-operation does not always exist between team members.
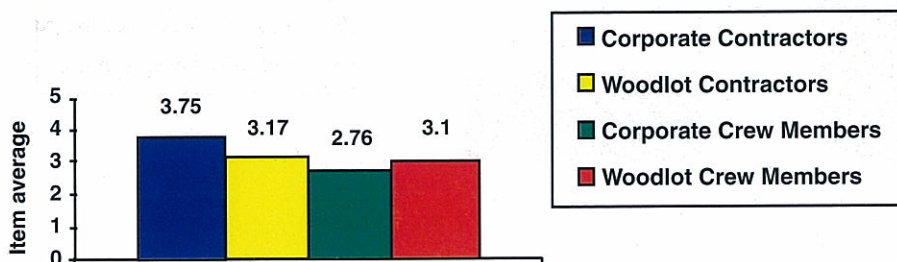
Figure 11 - Job Challenge and Variety perceived by subjects
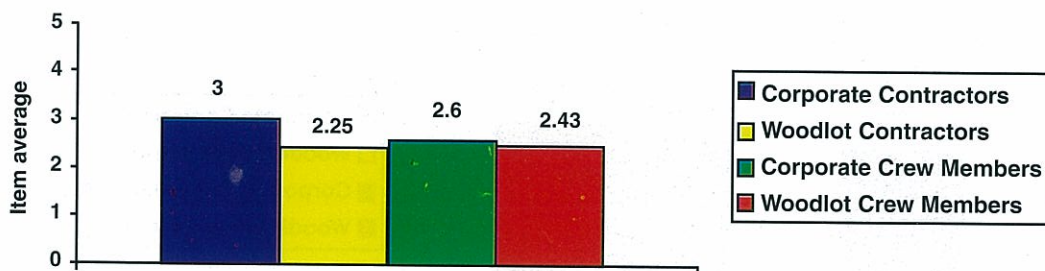
Figure 12 - Perceived work group co-operation

Crew members and contractors, overall, perceived below average co-operation from their respective work groups

This suggests that steps must be taken by both contractors and forestry companies to harmonise relationships between all work groups. Emotional exhaustion (O'Driscoll & Schuber, 1988), high turnover rates (Riggar et. al., 1987), and increased accident rates (Guastello, 1991) are all related to poor work relationships. Without taking notice of the above recommendations, further problems are likely to be created, and existing problems may increase.

Work Group Friendliness and Warmth
Crew members perceived more warm and friendly relations, trust and mutual liking among crew members, than contractors did from the forestry organisations (Figure 13). However, both groups perceived average work group friendliness and warmth.
Both crew members and contractors perceived average warm and friendly relations, trust and mutual liking among the crews and forestry organisations, respectively

Average work group friendliness and warmth should not be taken lightly. In such

a hazardous and ever changing work environment, good relationships among members are very important for creating strong teams who show concern towards each other. Contractors should make a point of creating better working relationships among their crew members, selecting new members on compatibility with existing members, and encouraging a greater team focused approach to work. Supervisors from the forestry organisations must also take steps to create an atmosphere that is seen as friendly and trusting. As contractors feel less friendliness and warmth from their supervisors, and because working relationships are so important in creating both an effective and efficient work environment, forestry organisations should try to formalise steps towards creating better relationships with the work force.

Leader Trust and Support
Figure 14 shows a slightly above average perception of both crew members and contractors respective leaders being aware of and responsive to their needs. It also shows that both groups felt their leaders showed a reasonable consideration for feelings of personal worth, and that they had an above average degree of confidence and trust in their leaders.

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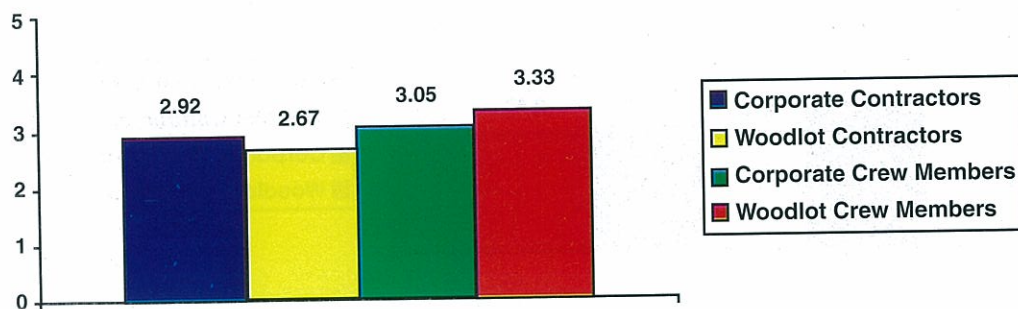
Figure 13 - Work group friendliness and warmth perceived by subjects
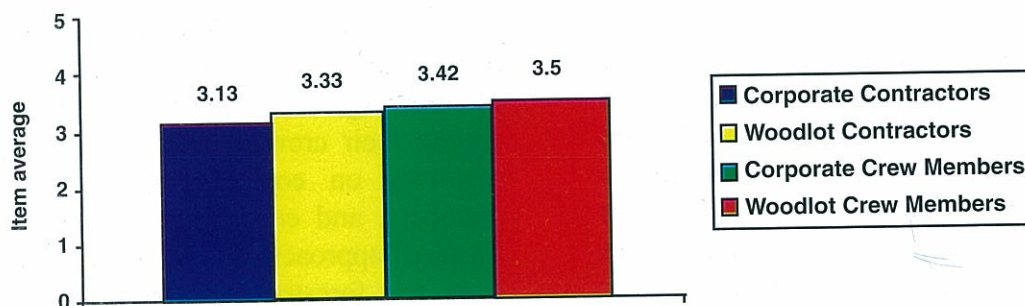
Figure 14 - Perceived leader trust and support

Crew members and contractors perceived a slightly above average level of trust in their leaders, and support from their leaders

Leader Goal Facilitation

Crew members and contractors perceived their leader encouraging involvement in group goals as average (see Figure 15). Involvement in group goals is an important work-related factor for any organisation. Feelings of helplessness and lack of recognition can result from a lack of ability to contribute with their leader to the overall team goals (Blake & Mouton, 1964).
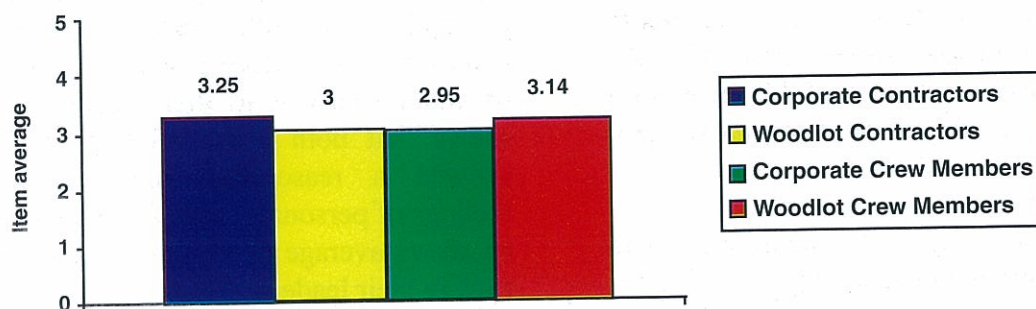
Figure 15 - Leader goal facilitation perceived by subjects

Generally, crew members and contractors felt that their respective leaders involved them in half the decisions on groups goals, and the other half of the time, left them out of the decision making

As group decisions affect the entire group, both contractors and forestry organisations should include those affected in goal decision making. As crew members and contractors are the ones who are at the start in meeting market demands, and taking part in manufacturing the product, they are the ones who know what goes on. Incorrect and ineffective decisions can easily be made when those who are doing the job do not contribute to decisions about that job. As one contractor stated of the forestry organisations, 'they have no idea what they are sometimes demanding us to do'.

Leader Interaction Facilitation

Crew members and contractors perceived an above average level of leader interaction facilitation (see Figure 16).

Overall, crew members and contractors perceived their leaders as above average when encouraging development of a close work group

Obviously, contractors and supervisors from the forestry organisations were trying to help create close work groups. However, from the results obtained, methods used by contractors and company supervisors to create cohesiveness among members were not as good as could be. More effort needs to go into developing better work group relations. As stated previously, many problems have been found to occur due to individual's perceptions of the lack of co-operation and friendliness among team members (O'Driscoll et. al., 1988; Riggar et. al., 1987).

The leadership results illustrate that contractor and supervisor leadership styles could be enhanced. Many researchers have noted that leadership is an important organisational factor affecting climate perceptions (Indik, 1968; Lewin, 1951; Blake & Mouton, 1964). Leaders are the key filters of workers' climate perceptions, helping create what an individual feels about a work environment (Schneider, 1983). What leaders do within this work environment could either help or decrease perceptions that lead to job satisfaction, excellent job performance, and overall wellbeing in the work environment.

Leaders are the key filters of worker's climate perceptions, thus they help create what an individual feels about a work environment (Schneider, 1983).
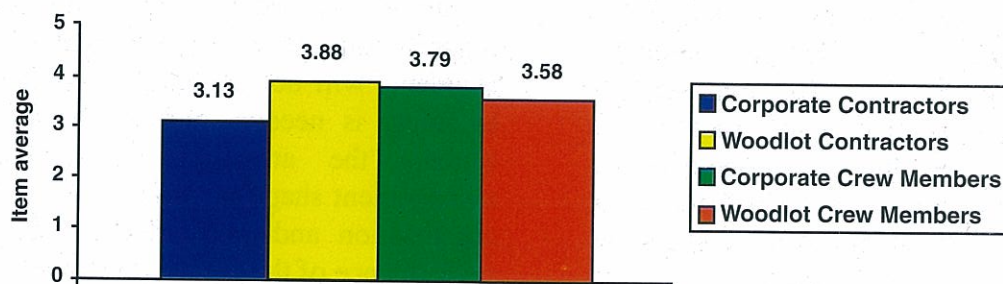
Figure 16 - Leader interaction facilitation perceived by subjects
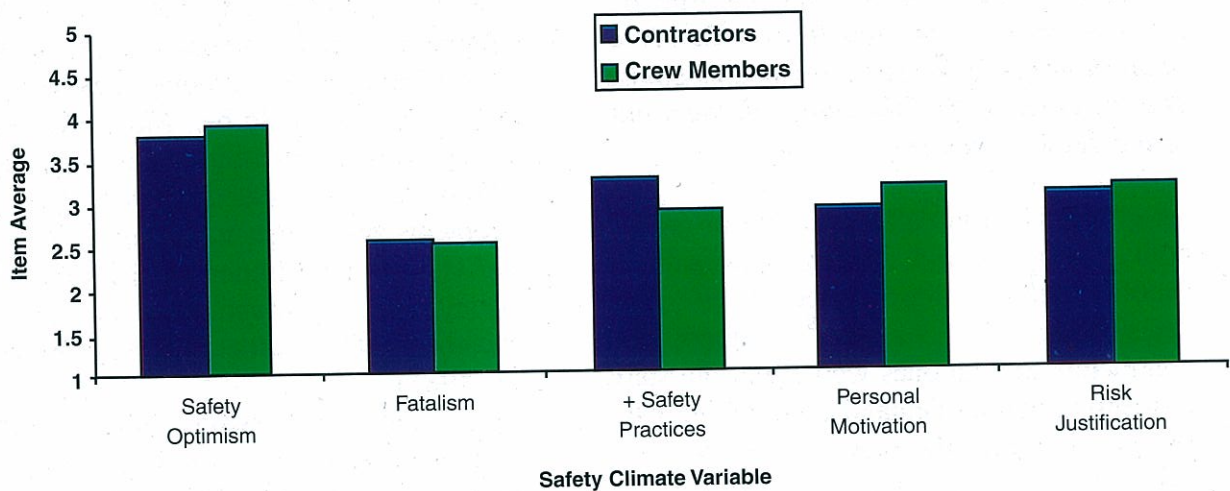
Figure 17 - Item average of safety climate variable perceptions

Safety Climate Perceptions

The safety climate of the logging industry can be interpreted as relatively insufficient in an industry which is known to be dangerous (Figure 17). Appendix B contains definitions of the safety climate variables.

Fatalism and safety optimism should be acknowledged as a problem. The below average item score for this variable indicates that both crew members and contractors perceived a lack control over their safety. This may be realistic as logging work always includes danger but when they: are overrunning safety procedures just because they are busy; perceiving that if they worried about safety all the time they would not get their job done; cannot avoid taking risks in their jobs; and feel accidents will happen no matter what they do, this realism should be seen as going too far. The first step to creating better perceptions should be initiated by the forestry organisations. Production pressure must be reduced to a level where all contractors and crew members feel they can work safely.

Both crew members and contractors perceived a lack of control over their own,

and other crew members safety

Production pressure must be cut to a level where all contractors and crew members feel they can handle their safety.

Figure 17 shows that crew members perceived more positive safety practices than contractors do. This could reflect supervisors from the forestry organisations not promoting safety activity as much as contractors. Hofmann, Jacobs, & Landy (1995) found that workers whose supervisors never mentioned safety, could develop perceptions of safety as being unimportant and therefore not attempt safe behaviour. Supervisors from forestry organisations must at least acknowledge these findings. If contractors feel there is no emphasis on safety from the forestry organisations, they may find that levels of accidents will not decline. A commitment to safety is needed, and as Dejoy (1990) stated, "the attitudes and actions of management shape the safety climate of the organisation and can influence the safety performance of the entire workforce".

Crew members felt that contractors promote better safety practices and

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commitment from superiors than supervisors do for contractors

The variable personal motivation for safety, reflected the contractor belief that if their supervisors praised them for safe behaviour, and safety procedures were more realistic, it *would* help them to work more safely. However, results showed that crews perceived these factors would *not* help them to work more safely. This suggests that supervisors are not providing enough positive endorsement for contractors. Obviously, the more support for safe behaviour from supervisors and forestry organisations, the more contractors will work safely. Supervisors must find a more practical safety procedure guideline if they hope to reduce accident rates.

Contractors felt that the more supervisors praise them on safe behaviour, and the more realistic the safety procedures, the more safely they would work

The risk justification variable in Figure 17 shows that both crew members and contractors have reasonably average perceptions of working unsafely. This is a result of not knowing what to do; trying to complete the task quickly, and the right equipment not being provided or not working. A better training regime is needed from both contractors and forestry organisations, with an improvement of equipment and more realistic production levels must be set, if accident levels are to fall.

Working unsafely is perceived by crew members and contractors as being because of a lack of knowledge of the task, the task needing to be completed quickly, and the correct equipment was not being provided or not working

Organisational Commitment of Logging Industry Members

Commitment within the logging industry was reasonably low (Figure 18) . Crew members had more loyalty towards their crews than contractors did towards forestry organisations. However, contractors felt they had more involvement with the forestry organisations than did crew members. Both crew members and contractors had reasonably low to average identification with their crew or forestry organisation, respectively.
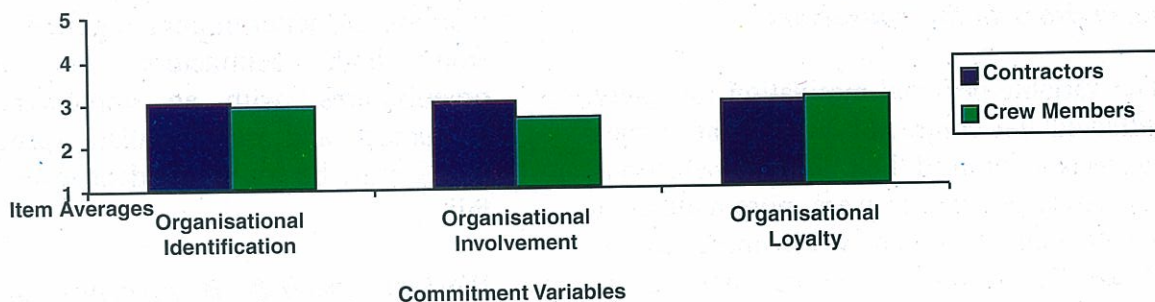
Figure 18 - Item averages of organisational commitment variables

The commitment of crew members and contractors was only below average to average

These results illustrate that contracting organisations need to increase the loyalty of their contractors by creating a sense of belonging that can develop into a 'wish to stay' (Cook, et. al., 1980). The forestry organisations should also take steps to develop contractor pride in the respective organisations, and convey goals and values that are realistic. This would allow the contractors to feel an identification with the organisation, and ultimately, commitment towards them. Contractors need to help crew members become more involved within their roles, if they are to create a level of commitment that could combat the problem of turnover. Furthermore, organisational identification and loyalty should be acknowledged as problems, due to the high rates of turnover among crew members. Committed people are more likely to remain with a crew or organisation and work toward organisational goals (Mowday, et. al., 1982).

The forestry organisations should take steps in developing the contractors pride in

the respective organisations and convey goals and values that are realistic if they want their contractors to feel an identification with them, and ultimately, commitment towards them.

Contractors need to help crew members become more involved within their roles if they are to create a level of commitment that could combat the turnover rate problem.

The overall intentions to turnover were reasonably low or just above average. Woodlot contractors had the least intentions to turnover, whereas woodlot crew members had the most intentions to turnover. These behavioural intentions should be observed by both contractors and crew members, because in combination with a moderate level of commitment, and high turnover rate, these intentions to turnover could create many problems.

Contractors and crew members had low to just above average intentions of quitting their forestry organisation contract or crew, respectively

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Intentions of Turnover

Figure 19 - Item averages of intention to turnover questions

Riggar et. al. (1987) discovered leaders in the rehabilitation field had immediate control over three of the four factors l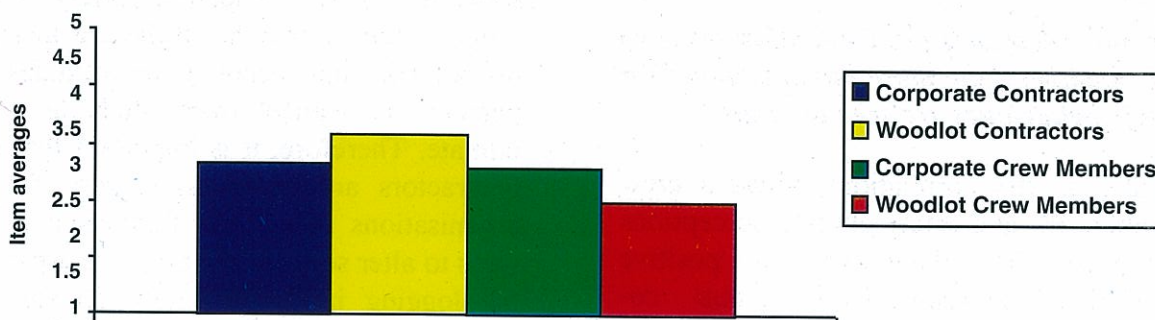eading to worker turnover. This suggests that contractors and supervisors are primarily responsible for taking action to reduce the intentions to turnover to minimal levels. The focus must be to improve commitment as previous research (Mowday et. al.'s, 1982; Parasuraman, 1982) implies that enhanced commitment leads to reduced turnover.

Correlations between Variables

A correlation can be defined as two variables that are related in some way. A positive correlation exists when one variable is strong and so is the other, or when one variable is weak and so is the other. A negative correlation is when one variable is strong and the other variable is weak, and vice versa.

Correlations between Psychological Climate and Safety Climate

Crew members perceptions of psychological climate (PC) were found to be directly linked to their perceptions of the safety climate. Role ambiguity was negatively related to the safety climate variable positive safety practices, and positively related to risk justification. These findings were similar to Sullman's (1998) study, who found that role stress was correlated to lost

time injuries.

This suggests that the more role ambiguity perceived by crew members, the less the contractor is seen to be committed to safety, the less workplace conditions are perceived as safe, and the more perceived circumstances in which unsafe behaviour can occur.

Role ambiguity should be reduced to a lower level, if the circumstances of unsafe behaviours are to decrease, and perceptions of safety practices and management commitment towards safety are to be increased. This implies that if contractors and forestry organisations were to redefine roles, rules, and criteria, safer perceived work conditions would be created and there would be no need to justify working unsafely, because there would not be any need for risk taking.

Contractors' perceptions also had a positive correlation between role ambiguity and positive safety practices. Endorsement from forestry organisations must be forthcoming towards reducing demands and performance criteria placed on contractors, if the safety climate is to improve.

The more crew members and contractors perceive demands from other tasks, the less

safety practices are seen as positive

The more demands felt from other tasks by crew members, the more circumstances for unsafe behaviours are seen to occur

Results on the correlations between crew members PC and safety climate perceptions illustrated that there was a positive correlation between work group co-operation and fatalism. This suggests that the better the co-operation between crew members, the more importance and controllability of safety felt. As only mild work group co-operation was perceived by crew members, contractors must try a new approach to creating closer teams, if more importance is to be placed on safety, and greater feelings of control over members safety are to be achieved.

The more co-operation a crew member feels from their crew, the more importance they will place on safety, and the more in control they will feel over their safety

A positive correlation was identified between crew members perceptions of leader interaction facilitation and positive safety practices. These results suggest that crew members will perceive better commitment from contractors towards safety, and will have better perceptions of a safe work place, if contractors encourage team work. Crew members did perceive above average leader interaction facilitation, but safety practices were perceived as only average. Again, contractors must encourage more team work for a better safety climate.

The more crew members perceive encouragement of team work from their contractor, the more they will perceive workplace conditions as safe, while also feeling more commitment from the leaders to safety

Williamson et. al. (1997) stated an

understanding of safety climate is very important when assessing safety needs. Safety solutions may fail if the organisations do not take into account the attitudes and perceptions gained from studying safety climate. Therefore, it is important that both contractors and supervisors from forestry organisations note these findings and take steps to alter some of the negative aspects of the logging industry's safety climate. It should be the 'leaders' role to alter the safety climate because as Dejoy (1985) concluded, "the safety attitudes of the first-line supervisor can have a significant positive or negative effect on the safety level of the work group".

It should be the 'leaders' role to alter the safety climate because as Dejoy (1985) concluded, "the safety attitudes of the first-line supervisor can have a significant positive or negative effect on the safety level of the work group".

Correlations between PC and Organisational Commitment

Both organisational identification and involvement had positive relationships with crew members' perceptions of work group co-operation. This implies that the more work group co-operation, the better the identification with, and involvement in, the crew. These results also suggest that work group co-operation should be acknowledged as an important factor and an area of concern within the logging industry.

The more crew members perceive co-operation from crew members to carry out tasks, the more the crew members will feel crew identification and involvement

Crew members' perceptions of leader goal facilitation illustrated a positive relationship with their perceptions of loyalty towards their crews. This implies that the more a

contractor encourages participation in decision making of group goals and meeting the group goals, the more a crew member will tend to feel attachment towards the crew. A sense of belonging will evolve usually becoming a 'wish to stay'. Parasuraman et. al. (1987) stated that leadership is an important factor in worker commitment, and that the greater the consideration and involvement from a leader, the better the worker commitment levels.

The more crew members perceive encouragement from the contractor to involve members in participating in the decision making of, and meeting of, group goals, the more loyalty a crew member will feel.

Organisational commitment, when weak, has been found by many researchers to contribute to high turnover rates (Mowday et. al., 1982; Parasuraman, 1982). When turnover rates are considered a problem, and a relationship exists between commitment and the workforce's perceptions of the work environment, superiors should make an effort to improve those variables recommended as most influencial.

Correlations between PC and Intentions to Turnover

Both crew members and contractors' perceptions of role conflict and intentions to turnover exhibited positive relationships. That is, the more their role performance was affected by pressures to engage in conflicting behaviours, the more likely they were to intend to quit. These pressures could be seen to stem from the forest company's production pressures. All contractors and some crew members stated that the pressures which come from the forestry organisations can be too much. One contractor stated he felt if they could have him out in the forest for 24 hours a day, they would.

The more a crew member and/or contractor feel affected by pressures from conflicting demands, the more a crew member/contractor will intend to quit their crew/forestry organisation

Crew members' perceptions of job variety and challenge had a negative relationship with intentions to turnover. This suggests that the less variety and challenge within their roles (the variety and challenge perceptions were reasonably low), the more tendency the crew members will have towards quitting their job. Plans should be put in place to allow for more variety and/or challenge within crew members jobs (for example, job rotation).

The less variety and challenge in crew members jobs, the more a crew member will intend to quit

The trust that supervisors gain from their contractors, and the more support they provide to their contractors should be seen as an important factor in decreasing the intentions to not renewing contracts. This is because there was a negative relationship found between leader trust and support and intentions to turnover.

The less support a contractor has from their supervisor, and the less trust they have in their supervisor, the more intentions to quit the forestry organisation

Intentions to turnover have been found to be one of the major forces in high turnover rates (Baron & Greenberg, 1989; Parasuraman, 1982). These intentions and their relationships with the climate variables should contribute to changes that have been needed in the logging industry for a long time if an efficient and satisfied workforce is to exist. In combination with future intentions and commitment results, these changes should be prioritised, if turnover

rates are to subside.

Correlations between Accident and Turnover Rates and other Variables

The contractors perceptions of some of the other variables, that is PC and safety climate, were related to crew member's turnover and accident rates, respectively. This provides further proof that the immediate supervisors, or contractors in this case, set the psychological climate of the crew. The crew members perceptions of the other variables, however, did not correlate with their own turnover and accident rates.

Turnover Rates

The contractors perception of role ambiguity was positively related to the overall turnover rate within crews. This suggests that the more a contractor perceives ambiguity in demands, and criteria with jobs and roles, the higher the turnover rate. This relationship needs to be acknowledged by contractors. That is, contractors must establish a way in which their perceived ambiguity is not 'picked up' by their respective crew members. Indik (1968) and Schneider (1983) found that leaders are the key 'filter' of workers work environment perceptions (PC). That is, they can keep their personnel from seeing the bad, and only focus on the positive. This filtering seems to be adequate as crew members perceived only mild ambiguity. However, if turnover rates are to be reduced, refinement of the contractors ambiguity perceptions should be one of the first tasks.

The more demands from other tasks and procedures, or role ambiguity, a contractor perceives, the higher the turnover rates within their crews will grow

Comments from contractors during visits indicated the company representatives were themselves continually fighting for their jobs in the very competitive environment of forestry organisations. The demands on the supervisors were thus thought to be very difficult. It can be assumed that the company representatives were also dealing with high levels of role ambiguity which may be 'filtering' through to the contractors. Although forestry organisations are in a very competitive and demanding industry, supervisors must learn that this kind of role stress can cause serious problems within an industry that has shown to have many relationships between work environment and adverse activities such as turnover and accident rate.

Accident Rates

Contractors perceptions of fatalism was found to be related to the overall crew turnover rate. This suggests that the less importance a contractor places on safety, and the less the contractor perceived control over safety, the higher the crew members accident rate. This relationship also implies that when a contractor feels more in control over safety, so will crew members. Crew members are therefore less likely to have an accident. These results present further proof that leaders contribute to crew members' climate perceptions.

The less the contractor perceives control over safety and the less perceptions of the importance of safety, the more likely the crew members are to have accidents.

Some of the items included in the fatalism variable included; safety works until we are busy then other things take priority, or, if I worried about safety all the time I would not get my job done. Though the contractors perceived mild to average fatalism feelings, there should not be any agreement with these statements in such a dangerous industry. Again, this highlights production pressure from the forestry organisations. If the workforce of the logging industry is to

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be a more effective, efficient, and profitable industry, combating problems like accidents, and creating an excellent safety climate is a positive step. More research into the relationship between role overload and unsafe behaviour is necessary.

CONCLUSIONS

The findings from this study suggest that the psychological climate of the logging industry may play an important role in work-related behaviours/perceptions. These include, safety climate, organisational commitment, intentions to turnover, and adverse activities such as accidents and turnover rates.

The study provided unexpected information. Although perceptions were not all positive, they were not as negative as expected. During a time when woodlot crews were under threat of non-continuance of contracts, and corporate crews had just received new output expectancies (much to the dismay of the contractors), the climate, perceptions and behaviours were not entirely critical. The logging industry is very unique in its environment for research, therefore there are many areas of research that should not be assumed.

In general, the psychological climate of the logging industry lacks a few qualities exhibited by very successful organisations. In particular is the contractors' perceptions of role ambiguity, which was related to most of the outcome variables within the present study, including crew member turnover rates. The lack of workgroup friendliness and warmth, more so for crew members, also needs attention. Leader support and facilitation was found to be adequate, though the stronger the leadership and relationships with leaders, the better the filtering of interpretations that provide some

basis for subordinates' perceptions of climate (Indik, 1968 and Schneider, 1983).

The safety climate of the logging industry could be interpreted as insufficient in an industry known for its hazards. The perceived lack of control over the subjects own safety, the common consensus that safety works until you are busy, and working unsafely because of the lack of knowledge and incorrect equipment, illustrates how much the contractors and ultimately, the forestry organisations must acknowledge a very serious problem, especially in role overload. As both contractors and crew members tended to perceive these work related factors similarly, it should be the contracting organisation's responsibility to create a more positive and effective safety climate. Williamson, et. al. (1997) concluded that changes in attitudes and perceptions about safety can often result from safety interventions, thus the knowledge of the safety perceptions gained from this study could be used as the basis for overdue changes.

Commitment within the logging industry was sufficient, though more loyalty is needed to encourage a more committed workforce. Loyalty has been labelled as the subjective well-being at work and materialises into 'a wish to stay' (Cook et. al., 1980). Thus the greater the loyalty, the more satisfied and committed the workforce. Intentions of quitting were also found to be moderate. With the turnover problems within the logging industry, enhancing commitment and lowering intentions to turnover should take priority. Mowday et. al. (1982) and Parasuraman (1982) suggest that to lower the levels of intentions to turnover, one must heighten the perceptions of commitment.

Only the contractors' perceptions of psychological climate and safety climate

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were related to turnover rates and accident rates, respectively. These high levels of turnover and accident rates are those which were the ultimate object of judgement for the present study. Though no other variables were found to be related to the major problems of the logging industry, obviously the crew members' leaders have a great affect on these adverse activities.

Lowering the contractor's perceived ambiguity by the contracting organisations is very important. That is, contractors must be more informed work issues and job responsibilities need to be more clearly defined. More clarity is needed on who has the authority to make decisions regarding their jobs and how their jobs fit into the overall objectives of the contracting organisation. The extent that it takes for advancement within the logging industry also needs to be clearly defined.

Commitment towards establishing contractors' feelings of greater control over safety should be paramount, as their fatalism perceptions were related to crew members accidents. That is, changes in the perceptions of; safety works until we are busy then other things take priority; if I worried about safety all the time I would not get my job done; I cannot avoid taking risks in my job; and accidents will happen no matter what I do. These negative perceptions should be the responsibility of contracting organisations, as most of the contractors pointed out, 'they don't give a stuff'. Changes in every level of the logging industry's hierarchy therefore need to take precedence.

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APPENDIX A

PSYCHOLOGICAL CLIMATE VARIABLES

Table 1   **Description of the eight Psychological Climate variables used in the present study.**

VARIABLE   DEFINITION

Role ambiguity	Degree of perceived ambiguity in demands, criteria and interfaces with other jobs-tasks-roles
Role conflict	Degree to which role performance is seen as affected by pressures to engage in conflicting or mutually exclusive behaviours
Job variety and challenge	Degree of perceived opportunity to make full use of abilities, skills, and knowledge: and the perceived range of tasks, equipment and behaviours involved in the job
Leader trust and support	Degree to which the leader is aware of and responsive to needs of subordinate and shows consideration for feelings of personal worth; and degree of confidence and trust in leader
Leader goal facilitation	Degree to which the leader is perceived as stimulating the subordinate's involvement in meeting group goals
Leader interaction facilitation	Degree to which the leader is perceived as encouraging development of a close and cohesive work group
Work group co-operation	Degree of perceived co-operative effort among work members to carry out tasks
Work group friendliness and warmth	Degree to which warm and friendly relations, trust and mutual liking among members are perceived

From Jones and James (1979) and James and Sells (1981).

APPENDIX B

SAFETY CLIMATE VARIABLES

Table 2   **Five Factor Solution of Safety Climate.**

Factor	Definition
Personal motivation for safety	Reflects the perceived deficiencies in the workplace which prevent respondents from working safely.
Risk justification	The circumstances in which unsafe behaviour actually occur.
Positive safety practice	Reflects perceptions of the workplace conditions, including the role and commitment of management to safety.
Fatalism	Reflects views of the importance and controllability of safety.
Optimism	Reflects the extent that the individual believes that their level of personal risk is favourable.

From Williamson, Feyer, Cairns, and Biancotti (1997).

ORGANISATIONAL COMMITMENT VARIABLES

Table 3   **Organisational Commitment Variables**

VARIABLE	DEFINITION
Organisational Identification	the pride one has in the organisation and the internalisation of the organisation's goals and values
Organisational Involvement	the psychological absorption in the activities of one's roles
Organisational Loyalty	the affection and attachment towards the organisation and the sense of belongingness that materialises into 'a wish to stay'

From Cook and Wall (1980)

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