# MANAGERIAL AND OPERATIONAL CHARACTERISTICS OF "SAFETY SUCCESSFUL" LOGGING CONTRACTORS

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(Abstract)

Twenty-six "safety successful" logging contractors in ten southeastern states were interviewed to document and determine their loss control methods. During the interviews, data were taken on the harvesting system, owner and crew demographics, management style, employee selection and training methods, workers compensation insurance rates, and accident history over the past five years.

Even though the contractors had fewer accidents, the data indicated that the majority of these contractors were similar to other contractors in their region in terms of age, education, harvesting method (i.e. clearcutting), crew size, method of payment, and harvesting system (i.e. mechanical felling with gate and motor-manual delimbing). However, the contractors in this study had more business experience, higher production rates, higher utilization of logging capacity, and substantially fewer accidents.

The major conclusions of the study were: 1) the contractors interviewed were better than "average" in terms of their safety record, but by no means accident-free, 2) contractors were similar to others in their region in terms of harvesting systems and crew size, but were able to produce at much higher rates while maintaining low accident frequencies, 3) crew

stability, tenure, and experience probably had the greatest effect on reducing the frequency and seriousness of accidents, 4) although important, safety was not a separate or distinct component of the management practices, 5) use of personal protective equipment was the norm rather than the exception on the contractors' operations, 6) contractors believed mechanization of the harvesting systems helped to reduce accident frequencies, 7) because of harvesting mechanization the type, location, and severity of accidents which occurred for this group of contractors differed from the larger population of loggers, 8) production and crew size did not affect the safety of the operation, 9) the benefits far out weighed the costs of maintaining a safe operation, and 10) all the contractors recognized the value of operating safely, but they felt that safety was just part of the normal operation of a well-managed logging business.

In summary, no one "key" characteristic or trait associated with safety was consistently found for this "select group" of small to large logging contractors, rather, overall safety was found to be only one part of their total business operation. The evolution of a "safety successful" contractor begins with effective management skills which, in turn, lead to consistent production levels, financial stability, lower labor turnover, and fewer accidents.

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# CHAPTER 1

## INTRODUCTION

Every year, thousands of woods workers are involved in accidents and near misses when working in the logging business. Estimates of annual work-related logging fatalities range from 129 to 218 deaths per 100,000 workers (Alt 1991). The Bureau of Labor Statistics' "Supplementary Data System" estimates 16,500 compensable injuries and illness occurred annually in the logging industry between 1980 and 1986 (Curtis 1991). The high injury incident rate is why logging is one of six industries targeted by Occupational Safety and Health Act (OSHA) for special attention (Conway 1982).

Logging accidents are costly in terms of personal injury to the employee and financially to the independent contractor's business. Accidents involve both direct and indirect costs. Direct costs are those related solely to the injured person damaged equipment, machinery etc. and can be insured against. Indirect cost are those which affect the owner, production, other employees, and or the finances of the business. It is estimated that for each $1.00 in direct cost there is at least $4.00 in indirect costs associated with each injury related accident (Lateiner 1965). Davis-Garvin Agency, an agency specializing in worker's compensation insurance estimates that

indirect costs of logging injuries at seven to nine times greater than the direct costs (Davis-Garvin 1984).

Some logging contractors recognize the high cost, both direct and indirect, of accidents and have made safety an important part of their operation. These "safety successful" contractors know that low accident history over a long period of time requires a strong management commitment and a positive "attitude" towards safety. Research, however, has not documented the reasons why some contractors are successful at lowering injury rates and maintaining them while others fail to operate safely. Furthermore, it is commonly believed that there are definite advantages, in terms of productivity and profitability, that can be realized from an effective loss control program, but there is little supporting documentation that quantifies the benefits of operating safely. The objectives of this study are to:

1. Document the operational characteristics and management techniques used by logging contractors with demonstrated success in maintaining low injury histories;

2. Document monetary benefits or savings (in terms of productivity and/or profitability) and non-monetary benefits that result from an effective loss control program.

# CHAPTER 2

# LITERATURE REVIEW

Logging safety has been and will continue to be a high priority area of concern to the forest industry. This concern has generated a wealth of literature about safety issues. This chapter summarizes current literature dealing with logging safety, and is organized into the following sections:

Logging Accident Statistics
Cost of Accidents
Worker's Compensation Insurance
Industrial Safety
Logging Safety
Management Commitment to Safety
Worker Training
Successful Safety Programs

## LOGGING ACCIDENT STATISTICS

Logging continues to be ranked as one of the most dangerous professions in the United States. In 1982, there were 20.4

injuries and illness per 100 full-time logging workers - more than 2.5 times the national rate (Department of Labor and Bureau of Labor Statistics 1984). The National Traumatic Occupational Fatalities (NTOF), which monitors occupational deaths based on death certificates, reports 1,088 deaths in the logging industry between 1980 and 1985 (Curtis 1991). This is an average rate increase of 218 deaths per 100,000 workers each year. In a recent article entitled "Death in the Woods" in the Sunday Oregonian Magazine, Phillips (1988) estimated that there is a one-in-six chance that any given logger will be at least temporarily disabled by a logging accident in 1988 and a one-in-three chance over the life of his career.

Logging is a dangerous occupation because men and powerful machines must operate in a rugged environment subject to the often uncontrollable forces of nature. In its "Proposed Safety Rules" for logging operations, the Occupational Safety and Health Administration describes logging as follows:

> [ Logging ] "By its physical nature it is a very difficult job with little room for error. Loggers are often dealing with the massive weight and irresistible momentum of falling, rolling, and sliding trees and logs. Logging operations are generally carried out in remote locations with limited accessibility, which vary in terrain from flat lands, wetlands, or gentle slopes to rugged mountains. As outdoor workers, loggers may be exposed to bitter cold, extreme heat, rain and snow.

> These factors, along with the use of the always potentially dangerous chain saw, have kept the logging industry consistently among the most hazardous in the country" (OSHA 1989).

Unsafe working conditions, however, is only one factor which contributes to high forest worker injury rates; unsafe acts are the primary cause of most forest worker injuries (Lewis 1986). In a California study of over 1,000 logging injuries and illness, 64% were classified as preventable by safety and health training/education (Garland 1979). Lateiner (1965) states that under normal circumstances unsafe conditions cause about 20% of all accidents; unsafe acts, 78%; and the remaining 2% are caused by acts of nature. Thus, the most important factor affecting logging safety is the worker with adequate skills to perform logging task (Garland 1979).

## COST OF ACCIDENTS

Occupational accidents in any industry are extremely costly in terms of personal injury to the employee and economic losses to the business. For North American industries (i.e. Canada and United States), employer costs alone are in excess of $50 billion (Cdn.) annually (Rohan and Brody 1984). Every accident has costs to the employer, employee, public administration, and the national economy (Klen 1989).

Accident costs can be classified into two groups: insured or "direct" costs and uninsured or "indirect costs" (Brody 1990) (See Figure 1).

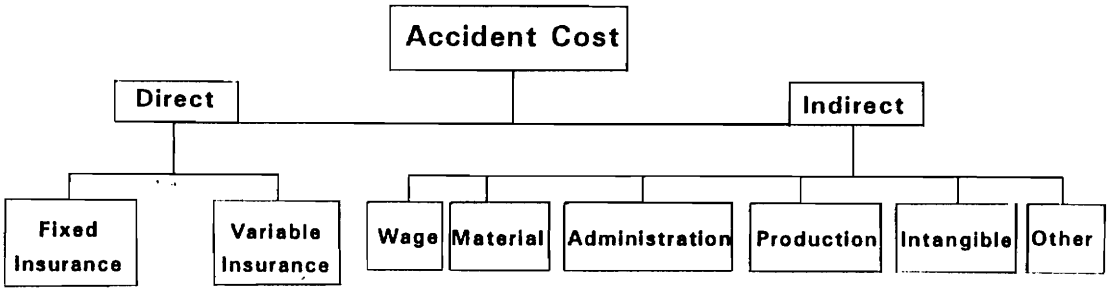



**Figure 1.1. Direct and Indirect Costs of Accidents**

Direct costs are those for which insurance can be purchased to protect the company against claims resulting from specific accidents. The insurance typically covers medical expenses and lost wages of the victim during their absence from work. "Insurance provides the firm with protection against risk of financial loss when an accident does occur, but it is often over looked that insurance does nothing to reduce the risk of accidents" (Brody 1990).

The cost of insurance contains two components; "fixed" and "variable". Fixed costs are largely independent of the

number and severity of accidents for an individual firm, and sometimes are categorized as "uncontrollable" since the firm has little control over this part of the insurance premium. The variable component is typically based on an "experience rating" which is established and adjusted by accident number and severity. This cost can be considered "controllable" since a lower frequency of accidents can reduce premium costs. Insurance Department officials in New Hampshire attribute a recent 6.3% decrease in worker's compensation rates for logging (code 2702) to the fact that "improved loss control in the past few years is beginning to show up in actuarial statistics" (Neibling 1991).

In addition to direct costs, there are a number of "indirect" costs resulting from work accidents which are absorbed entirely by the employer. These indirect costs can be grouped into six main categories: wage costs, material damage, administrator time, production losses, other costs, and intangible costs (Figure 1). Wage cost is the amount of time (on the day of the accident) the victim and various employees are paid, but do not actually work. Material damage includes the cost of machinery repairs, raw material loss, clean up, and insurance deductibles related to the accident. Administrative costs include the amount of time required to reorganize production, replace the injured

employee, train a new employee, and process insurance forms. Production losses include those beyond the day of the accident which may be caused by lower output of the replacement employee, injured employee, and other employees. Other costs not covered by the insurance may include first-aid materials, transportation to the hospital, litigation costs, and fringe benefits which continue to be paid to the injured employee and his/her family. Intangible costs or "unquantifiable" costs of an accident also affect the business and include things such as tarnished public image, poor labor relations, reduced morale, and higher employee turnover and absenteeism.

## WORKERS' COMPENSATION INSURANCE

Rapidly rising insurance rates has been one of the driving forces behind much of the safety awareness in the past twenty years. The Southeastern Wood Producers Association (SWPA) reports the manual rate for logging (code 2702) in Florida jumped from $16.26 to $35.78 per $100 of payroll from 1987 to 1990, an increase of 120% (Anonymous 1991). Canal Wood Corporation, a large southern timber supplier, attributes their recent commitment to safety "to the impact of their insurance programs on their bottom line -- profit

(Estes 1987). The current atmosphere regarding logging safety can be summarized in an Oregon logger's statement, "There's been more emphasis on safety in the past two years than in the previous twenty" (Donnell 1988).

Workers' compensation insurance rates are based on a manual rate which reflects the potential risk of an occupation developed by the National Council on Compensation Insurance (NCCI). NCCI develops manual rates as a function of benefits and the loss experience for each classification code in each state (Wilson and Stuart 1990). The business of timber harvesting has two main classification codes: 2702 for logging and 2705 for pulpwood. In some states a new code 2719 has been created for mechanized harvesting operations (i.e. Mississippi, Michigan).

Each contractor's manual rate is adjusted by an experience modification factor. The experience modification factor is a mechanism for rewarding or penalizing the contractor based on his individual loss experience (Wilson and Stuart 1990). An experience modification factor is basically developed from the ratio of the contractors actual losses to the contractors expected losses over the past three years excluding the previous year. The experience modifier is

then multiplied by the manual rate to obtain the workers' compensation premium per $100 of payroll or per unit of production. A high claims frequency will increase the modifier (i.e. greater than 1.0), adjusting the manual rate upward, and a low claims frequency will reduce the modifier (i.e. less than 1.0) and adjust the manual rate down. Frequency of accidents does not indicate the severity of accidents. A contractor may only have one accident but the severity could incur workers' compensation exceeding several small claims. The experience modification factor does adjust for severity and Wilson (1989) found it to be a consistent method for weighing accident frequency. In addition to the experience modification factor insurance companies may use premium discounts, retrospective rating plans, or schedule rating plans to customize the workers' compensation premium to the specific contractor (Wilson and Stuart 1990). All three are a means of rewarding the contractor for a low claims frequency.

As stated above the experience modification factor is based on the past three years, excluding the previous year. This is done to limit the variance of the experience modification factor, but it also prohibits any immediate financial incentive that could be provided through this type of premium modification (Wilson 1989). The savings due to a

low experience modifier may be totally absorbed by the manual rate increases from year to year. This acts as a disincentive to contractors to invest in the short term costs of safety training and safety devices which may show a benefit that is outweighed by rising insurance cost.

All businesses employing three or more people are required to carry workers' compensation insurance for each of its employees. Typically, independent logging contractors arrange workers' compensation insurance through various insurance plans including individual plans, state self-insurance funds, assigned risk pools, pulp and paper companies and insurance "vendor-to" programs, and local cooperative groups formed for insurance purposes. Some of these insurance plans assign the contractor with an individual experience modification factor based on their individual loss history, and some "vendor-to" plans assign one experience modification factor for the group's loss history. The former is more common, and some states no longer allow "vender-to" policies to operate due to legal restrictions.

Workers' compensation insurance is regulated by each individual state. For example, some states use three codes 2702 for logging, 2705 for pulpwood, and 2719 for mechanized

harvesting to classify logging operations, while others may only use 2702 to classify all the forms of logging that occur in their state. Also, some states allow loggers to pay premiums per $100 of salary or per unit of production, while other states allow payment based on salary only. Per unit rates have been removed in some states due to premium "slippage" caused by under reporting of production.

For a more detailed discussion of the complex area of workers' compensation refer to "Analysis of Workers' Compensation in the Southeastern United States Logging Industry" by Wilson (1989).

## INDUSTRIAL SAFETY

Literature pertinent to industrial safety is almost endless since every form of business must deal with occupational safety in one form or another. This section reviews selected industrial safety literature that may have application to this study.

Before 1911, industrial safety was practically nonexistent in the United States, due in most part to few states having workmens' compensation laws (Petersen 1971). Prior to 1911, all state's handled industrial injuries under "common law",

which almost ensured that management of industry would not have to pay for accidents that occurred on the job, because the injured employee had to sue to receive recompense. If management could show any of the following it did not have to compensate the injured employee (Petersen 1971):

1. The employee himself contributed to the cause of the accident;
2. Another employee contributed to the accident cause;
3. The employee knew of the hazards involved in the accident before his injury, and still agreed to work in these conditions for pay; or
4. There was no employer negligence.

The industrial safety movement began with the first workmen's compensation law passed and upheld in 1911. This law required management to pay for injuries that occurred on the job. During the early years, the safety movement concentrated on correcting hazardous conditions that existed in the work place. In the first 20 years from 1912 to 1933 industrial deaths fell from around 19,000 annually to 14,500 annually (Petersen 1971). This reduction in deaths mainly resulted from cleaning up the most obvious hazards and unsafe working conditions.

In 1931, the publication of H.W. Heinrich's book, Industrial Accident Prevention, set the stage for much of the future

research in industrial safety. Heinrich (1931) suggested that people cause far more accidents than unsafe working conditions do. From the 1930s to 1960s, research concentrating on the human factors of safety helped reduce the accident frequency and severity rates from 1931 to 1969 (Petersen 1971). Progress in industrial safety has slowed since the 1950s and in some areas ground has been lost in the battle to control occupational accidents. Many researchers suggest a reexamination of techniques to carry industrial safety into the future.

Some of the current literature probes the traditional techniques and introduces new ideas. A recent study in the ship building industry dealt with the effects of safety campaigns using slogan signboards with specific safety instructions along with feedback from employees (Saarela et al. 1988). The use of slogan signboards in the forest products industry is very extensive. The results of the study indicated that the campaign was received well and the message could be recalled, but there was no notable change in the number or seriousness of the accidents.

Another current topic in all forms of industrial safety is "behavior analysis" which is discussed by many authors as a means of accident prevention. Behavior analysis is a two

step approach to improving human performance toward accident prevention. The first step is to describe the unsafe behavior performed by looking at what causes this behavior, and the factors that reinforce this behavior. The second step is to observe these unsafe behaviors and to form a behavior modification plan to decrease unsafe conditions and unsafe acts. Mattily and Hyodynmaa (1987) applied the behavior analyses approach to the building (construction) industry in Finland where special features tend to decrease occupational safety; including the changing work environment, outdoor work, lots of materials handling, poor housekeeping, work planning at the site, different sites, types of wages, and new organizations at every project. The data revealed that the behavioral approach along with verbal and written feedback affected safety even in the difficult setting of construction. The accident rate on the experimental site was 31% lower and the accidents that occurred had a 20% lower severity rate than on the control site. Also, usage of personal safety equipment was increased, with hard hat usage by workers reaching 90%. Application of the behavioral approach may be useful in logging since it operates under somewhat similar conditions.

## LOGGING SAFETY

Increased mechanization of the logging industry has helped improve logging safety in the past 20 years. Canadian research indicates the decrease in frequency of occupational accidents in the logging industry is a positive result of mechanization of delimbing and debranching activities (Laflamme and Cloutier 1988). They reported that mechanized operations had an average individual risk three times lower than conventional harvesting operations (i.e. motor manual). The Laflamme and Cloutier (1988) study also indicated that risk exposure on mechanized operations appears to shift from immediate production tasks to other tasks which are secondary or related to production (i.e. maintenance and repair). These secondary task take place over shorter lengths of time and may not take place every day but may take place once a week or month. The Maine Forest Products Council states "the increase in mechanized logging in recent years has reduced exposure to hazards and greatly improved safety" (Anonymous 1988). In Sweden, 2,500 logging accidents have been documented since 1960, of which less than 100 occurred on mechanized logging sites (FMG 1991). Also, accidents on Swedish mechanized logging jobs generally resulted in less serious injuries than on motor manual logging operations.

Reduced accident risk on mechanized operations is a major reason why several states are considering new workers' compensation categories based on mechanization. The Southeastern Wood Producers Association (SWPA) recently appealed to the National Council On Compensation Insurance (NCCI) for changes in the compensation rules relating to woods producers (Anonymous 1991). The changes recommended by SWPA include:

1. Creation of highly mechanized logging code based on stringent safety criteria;
2. Implementation of premium rate credits to provide safety incentives for non-mechanized wood producers (similar to those used in other types of insurance); and
3. Reclassification of specific jobs where the employee is not directly exposed to hazards normally associated with a woods operation.

Mississippi is currently one of the few states that has a separate workers compensation insurance code (2719) for mechanized loggers. Mississippi's 1991 rate for code 2719 is $26.55 per $100 of payroll and the regular rate for code 2702 (Logging) is $35.97 per $100 payroll (Davis 1991). This is a 26% savings per year for those contractors that qualify for the lower mechanized rate.

However, an unpublished paper by Wilson and Stuart (1989)

found no correlation in experience modification factors to support a new mechanized classification code for logging. Their study was based on experience modification factors from 24 loggers in Louisiana. Results indicated that the experience modification method factor was functioning well and compensating for loss differences due to harvesting system mechanization. Stuart (1991) states mechanization of the logging industry will bring different types of workers compensation claims dealing with stress related injuries (i.e. carpal tunnel syndrome). Carpal tunnel syndrome and other stress related injuries are caused by repeated body movements over prolonged periods of time and can develop into a disabling disease especially in the wrists and hands (Fisher 1992). These types of injuries have appeared in many Scandinavian countries were mechanized harvesting has been in place longer than in the United States.

Another improvement in logging safety has been the introduction and use of personal protective equipment and safety engineered equipment. In 1986 chain saw accidents accounted for 30% of all claims in some regions of Canal Wood Corporation's procurement areas, but in 1991 figures indicate a 3% drop in all claims. Canal Wood Corporation attributes this decline in chain saw accidents to increased use of saw chaps and chain brakes (Porter 1991). A

International Labor Organization (1981) report, citing data from Finland, Sweden, Denmark, and Switzerland, indicates a reduction of chain saw accidents through introduction of safety devices. These safety devices included chain brakes, kick back guards, and the use of saw chaps.

The forest industry, insurance organizations, equipment manufacturers, research institutes and government agencies continue to look for ways to lower the risk of injury to woods workers. In the past twenty years, some success has been reached in the reduction of logging injuries sustained by contractors, but safety remains a high priority for the forest industry. From 1973 to 1986, the injury incident rate per 100 full-time employees working in logging camps and for logging contractors fell from 32.1 to 19.1, but remains 240 percent higher than the "all industry" rate of 7.9 (Wilson 1989).

A current movement in logging safety is more federal involvement by the Occupational Safety and Health Administration (OSHA). The majority of logging contractors have heard of OSHA and have seen bulletins put out by them, but very few have been inspected or visited by OSHA inspectors. OSHA's "revised" list of rules addressing logging safety is long and detailed. The OSHA rules

(expected to be approved in October of 1992) will put more emphasis on training, general requirements, tools, and environmental conditions. For example, employees will be required to have initial training before working on a logging job, plus annual training and retraining for new jobs. This training must cover recognition of safety hazards for their specific job, recognition of general logging safety hazards, certified first-aid training, and preventive and protective measures. OSHA requires training for all employees, but does not specify who is qualified to be a trainer, or how the training should be conducted.

## MANAGEMENT COMMITMENT TO SAFETY

The direct correlation between good management and a good safety record is a common theme found in the literature. In logging, like any other business, the primary reason for a poor safety record is poor management and lack of adequate supervision (Conway 1982).

Management must show a commitment to safety in order to achieve a safe work place, and it must take responsibility for the physical and mental welfare of all its employees (Conway 1982). A management commitment to safety via a loss

control program is usually the first step towards motivating woods workers to perform logging tasks while being aware of potential hazards.

Motivation is another key component to a safety conscious work force, and may be the best way to reduce logging injuries beyond the current rate. The American Pulpwood Association's Harvesting Research Project has defined motivation in pulpwood harvesting as "any behavior that leads to effective organizational performance" (Plummer 1971). Effective performance for logging operations is generally measured in terms of high productivity, low absenteeism, low turnover and a low injury rate.

Management involvement is an important part of employee motivation. If management does not demonstrate that they are serious about operating safely, the employees will not take safety seriously (Brown 1988). In a recent unpublished APA technical release, the most frequently cited motivating factor for the use of personal protective equipment was the "Owner sets example by using personal protective equipment / safety devices himself." Improved motivation to wear safety devices due to visual feedback is supported by research conducted in the field of industrial safety. Schneider et al.(1974) conducted a study with lathe

operators in shipyards to increase the use of safety glasses. One group of study participants was verbally given thorough knowledge about risks and how various materials may cause eye injury, while another group was shown only slides of operators wearing the correct safety equipment and operating in a safe manner. The results showed that the "visually instructed" group started to wear the safety glasses considerably more often than the "verbally instructed" group. Schneider et al. (1974) conclude that mental images probably constitute the basis for learning proper operating skills more than verbal instructions.

Peters (1991) describes and summarizes the empirical data of five main strategies for encouraging employees to adopt self-protective behaviors and/or to avoid unsafe acts. These strategies were especially important to management in industries such as underground coal mining (i.e similar to logging) where the work environment is naturally hazardous, rapidly changing, and difficult to predict, making it very difficult, perhaps impossible, to fully protect the employee by environmental manipulations (Peters 1991). The five strategies were: (1) incentives, (2) disciplinary, (3) fear messages, (4) behavior modeling, and (5) employee surveys.

Peters (1991) states that incentives are an effective way to

improve compliance with safety rules. Past research has found that incentives or feedback were successful at improving safety conditions or reducing accidents because they offered a reward for complying with safety rules. This research also showed withdrawal of incentives drastically reduced safety compliance. Disciplinary actions were found to be ineffective, hard to enforce, and in some instances negatively affected safety awareness. Fear messages (factually informative material, emotionally arousing etc.) produced multiple responses. Depending on the person, fear messages at best improved safety awareness or at worst produced a level of fear which reduced productivity. Research on behavior modeling which demonstrated proper techniques along with feedback resulted in improved skills and safety awareness when properly applied by management. Employee surveys were shown to be a good way to improve safety records while enhancing employee relations, because the employees helped to construct the safety plan and were more inclined to follow the rules (Peters 1991).

## WORKER TRAINING

Many researchers agree that safety training is of vital importance, but there is no unanimity about what in practice

should follow from that proposition (Hale 1984). This statement holds true for those concerned with training in the logging industry. Training to improve productivity and safety of forest workers has gained importance in the past two decades as a topic for forest industry and academia, while most independent contractors have little, if any formal training for their employees. Garland (1979) reports that over 90% of Oregon's logging firms have no structured skill training program other than on-the-job training.

Some research with skill and safety training of woods workers has been done by insurance companies, self-insurance funds, American Pulpwood Association, and safety consultants. This work is well documented, but evaluation of the effectiveness of their safety training programs is often lacking. This is similar to literature reviews of industrial safety conducted by Hale and Hale 1972; Cohen et al. 1979; Heath 1981; Jonah et al. 1982; Edwards and Ellis 1976, who all state that few studies have been published which evaluate the effectiveness of safety training programs (Hale 1984).

Determining the type of training to be implemented for improving logging safety is difficult. Hale and Hale's (1972) review of industrial safety training indicates that

there are almost as many studies showing that job training had no effect on safety as there are studies showing a positive effect. This was due to the wide variation in the quality of the training. Training programs with good design showed significant reductions in accidents in trained groups as opposed to untrained. A study by Cohen et al. (1979), that compared companies matched with high and low accident frequency, found the low accident group had more safety training than the high accident group which had less safety training. Thus, training can be effective when properly designed and implemented to achieve a specific goal.

## SUCCESSFUL SAFETY PROGRAMS

A number of successful logging safety programs can be found in the literature, and a summary of a few programs currently used by the forest industry are presented in this section.

### Walsh Timber Company

Walsh Timber Company (WTC), of Noble, Louisiana has developed a detailed approach to loss control aimed at logging accident prevention (Cupp 1989). The program consists of a pre-employment screening, safety inspections, training, and accident investigations. The pre-employment

screening is used to obtain information such as work experience, education, references, and medical history. A physical is also given to screen potential health problems and to establish a health base line for the prospective employee.

Safety inspections and training are also used to motivate WTC employees to work safely. A safety inspector documents lost-time accidents and inspects the job site once a month. Meetings on the job use safety literature and videos as teaching aids. Crews receive training on how to promote a safe work place and are encouraged to take classes to become certified workers in first aid, cpr, and chain saw operation. In addition to training and inspections an incentive program is also used to promote safe work habits. Individual crews receive awards for working one year without a lost-time accident. Prior to initiating the program, Walsh Timber Company's losses were $120,000 annually, and after initiating the safety program losses dropped to $25,000 annually in 1989.

Hanington Brothers, Inc.

Hanington Brothers, Inc., of Macwahoc, Maine, have also emphasized management commitment to improve safety and loss

control for their company crews (Meyer 1990). Hanington's management requires woods workers to wear personal protective equipment such as hard hats, chaps, and steel-toed boots which are supplied at cost by the company (Meyer 1982). Bimonthly safety meetings are held for safety training, with guest speakers or safety films. Employees are rewarded for safety with two annual banquets, company sponsored picnics, and a Christmas party. Hanington Brothers, Inc. also communicates with the employees via a news letter "Hanington Happenings", which includes personal notes, short poems, safety reminders, OSHA statistics, and its own version of a "Safety Alert" (Meyer 1989).

The company's safety program has successfully reduced Hanington's worker's compensation experience modifier from 1.38 in 1986 to 0.92 in 1990. Savings resulting from the safety program are shared with their employees. Two-thirds is used for an employee safety bonus, and one-third is used to hire a part-time safety consultant. In addition, Hanington Brothers Inc. is a member of the Northern Woods Logging Association (NWLA), a group of Maine loggers organized to provide lower workers' compensation insurance. The group has its own self inspection program that monitors current members and reviews prospective members.

Canal Wood Corporation

Canal Wood Corporation, based in Charlotte, North Carolina and Conway, South Carolina view their safety program as a long-term investment which will pay off with stable production, lower workers' compensation rates, and stable markets (Porter 1991). Canal Wood implemented their program to reduce insurance cost to producers and to provide a safer work place. By means of a voluntary program, wood producers can receive insurance coverage for equipment, liability, and workers' compensation. To receive these benefits, producers must sign and comply with the "Safe Logger Agreement" which specifies a set of written safety standards.

Canal's program employ's three full-time safety coordinators that conduct safety surveys to check for compliance and answer safety related questions. "Safety Suppers" are held to review recent accidents and critique other producer's jobs that were video-taped by the safety coordinators. Safety coordinators also follow-up claims to ensure they are processed quickly and fairly. Communication with the safety program is aided by the Canal's "Safety Bulletin" which contains technical safety releases, highlights accident-free producers, and descriptions of recent logging accidents.

The $150,000 annual cost of Canal Wood's safety program has paid off in the form of lower accident rates and reduced insurance premiums. In 1986, chain saw accidents accounted for 30% of the claims, but in 1990 they dropped to only 3%. From 1988 to 1990, the accident frequency (per 10,000 tons of wood produced) dropped from 0.76 to 0.54, and total losses decreased 43%. This has enabled the South Carolina producers enrolled in the "Safe Logger Agreement" program to pay 20% less for their workers' compensation insurance than they did in 1983.

NORTIM Corporation

NORTIM Corporation, headquartered in Pittsburgh, Pennsylvania, operates a logging risk-management company. This unique company is not a insurance carrier, but provides insurance, safety, and production training for independent logging contractors. NORTIM acquires workers compensation insurance for its members from various carriers who are able to offer the group individual policies at the best rates (Wimble 1991). The rate the contractor receives is contingent on the mandatory safety and production training that must be completed by his crew members along with the contractor's accident history. NORTIM provides the mandatory safety and production training free of charge, in

group sessions held throughout Pennsylvania. Currently there are four levels of safety training dealing with chain saw felling and limbing. Future plans are to have training sessions devoted to improving business management, skidding, loading, and job layout (Wimble 1991). Completing all four levels gives the contractor an automatic discount on their worker's compensation premium, and a successful loss control history can further reduce the premium. NORTIM members are inspected regularly by safety coordinators to insure compliance and help members work safer. Since NORTIM's incorporation in 1979, its membership has grown to over 400 independent logging contractors (NORTIM 1991).

## SUMMARY

Improved logging safety is a primary goal for the forest industry, insurance companies, academia, and others concerned about the high frequency of logging accidents. Statistics indicate logging continues to be one of the most hazardous professions in the world. The physical conditions, and unsafe acts by workers on logging operations, create the high number of accidents that occur annually. These accidents incur varying amounts of direct and indirect costs which hurt society economically and

nonmonetarily. Development of occupational safety programs has helped reduce the amount of industry accidents overall, but logging continues to be a dangerous profession. Renewed commitment to safety, worker training, mechanization, and an overall awareness of potential hazards have helped to improve logging safety. Insurance companies, however, continue to increase worker's compensation premiums to cover losses, and loggers continue to be involved in accidents daily. The objective of this research is to study "safety successful" independent logging contractors who are able to reduce the cost of worker's compensation via reduced accident frequency. The hope is to identify effective control methods that can be used by other contractors so they can improve the safety of their logging operations.

# CHAPTER 3

# METHODS AND PROCEDURES

The approach used to study "safety successful" logging contractors utilized personal interviews as the primary means of data collection. This research format was selected based on the previous success in documenting the characteristics of independent logging contractors in the southeast used by Haggard (1981), Corwin (1987), and Loving (1991). The current study focuses on the management style of the individual contractors, work experience of the crew, and operating techniques which contribute to lower accident frequency and reduced worker compensation insurance premiums.

## STUDY PARTICIPANTS

Forest industry cooperators in the project, insurance carriers, and state self-insurance funds were contacted to identify a list of "safety successful" contractors for the study. Identification was based primarily on their accident history for the past 3-5 years (i.e. low experience modification factor and claims history). From these sources a list of over sixty "safety successful" contractors operating throughout the southeast and mid-Atlantic states

was obtained.

Time and budget constraints limited the number of contractors that could actually be visited and interviewed. From the original list of names, twenty-six contractors were selected for in-depth interviews. The selection process was based on the following criteria:

1. Experience modification factor in the range of 0.6 - 1.0;
2. Geographic distribution through out the East;
3. Willingness to participate in the study; and
4. General background information (i.e. reputation within the local community and industry, quality workmanship, and "Logger-of-the-Year" candidates).

Following the initial screening of the contractors, local company representatives (or representatives of insurance carriers, or self-insurance funds) were enlisted to help set up initial contacts and provide introductions to the logging contractors.

## INTERVIEW PROCESS

A questionnaire was developed to guide the interview process

and to attempt to standardize the information obtained from each contractor. In some cases the interviews were tape recorded to insure the accuracy of the data. Contractors were interviewed at a convenient location and an open discussion or conversational format was used. Most of the interviews were conducted at the job site and usually lasted from forty-five minutes to two hours. The following topics were discussed during each interview:

1. Explanation of study objectives and expected value to contractor and industry

2. Type of harvesting system
   a. Mechanization level
   b. Equipment spread
   c. Product form
   d. Cutting method
   e. Production level

3. Crew information
   a. Number employees/crews
   b. Years with crew
   c. Hours worked/week
   d. Method of payment

4. Contractors management style
   a. Owners position or function
   b. Method of supervision (Foreman or no supervision)
   c. Attitude/philosophy toward safety

5. Worker's compensation insurance
   a. Carrier or company
   b. Experience modification factor
   c. Current rate and premium discount
   d. Accident history (Past 3-5 years)

6. Personal safety equipment
   a. Owner or employee provided
   b. Mandatory or voluntary use

7. Monetary benefits of safety
8. Non-monetary benefits of safety
9. Open-ended questions and summary statements
10. Company safety program (if applicable)

A more detailed outline of the questionnaire is provided in Appendix A.

In addition to the interviews two separate and shorter questionnaires were sent out to gather additional information not obtained during the on-site visits and to clarify the data collected. The information for each contractor was then summarized into a personal data summary sheet. The contractors were then asked to correct and/or add to the data summary sheets. The data sheets were returned and corrections made, if necessary.

## INSURANCE AND ACCIDENT HISTORY

The contractors were asked to provide information about their current worker's compensation rates, experience modification factors, and accident history for the last 3-5 years. This information was critical in determining whether the contractors were truly successful in terms of safety and for including in the study. Wherever possible, the contractor's workers compensation insurance carrier was also

contacted to verify the accuracy of the information on worker's compensation rate, experience modification factor, and loss claims history. However, in some cases insurance carriers and contractors elected not to provide complete information on premiums paid and claims history.

## DATA ANALYSIS

Data summary sheets were prepared for each contractor from the interviews (See Appendix B). Initial analysis of the data consisted of frequency counts, distribution plots, and tests for data entry errors.

The numerical data from the summary sheets were entered into a computer spreadsheet for further analysis and plotting. Non-numerical data (i.e. type of harvesting method, management style etc.) were coded into the spreadsheet so basic statistics could be computed. Averages, totals, and ranges were computed for numerical data whenever the sample size was appropriate.

Due to the need for privacy and confidentiality of some of the data requested from insurance companies (i.e. premiums, loss history and premium discounts due to low loss

histories) not all of the information was obtained for all of the contractors participating in the study. Whenever less than complete data was obtained, it will be noted as such throughout the discussion of the results. Analysis of the insurance data consisted of quantifying annual savings due to good accident histories and, in some cases, training. The study was designed to document information, thus hypothesis tests were not conducted due to small samples and lack of complete numerical data in some cases.

# CHAPTER 4

# RESULTS AND DISCUSSION

A total of 26 "safety successful" logging contractors in 10 southeastern states were interviewed to obtain the data used in this study. The contractors interviewed were a select group chosen using the criteria outlined in Chapter 3. The data presented in this report should not be interpreted as representative of an "average" or "typical" logging contractor even though these contractors were similar to other logging contractors working in their respective regions in terms of the equipment used and method of operation. The data presented are valid for the May 1991 to December 1991 time period.

## CONTRACTOR DEMOGRAPHICS

An attempt was made to survey logging contractors located across the southern and eastern United States. The number of contractors interviewed and the states they operated in are as follows:

| | | | |
|---|---|---|---|
| Alabama | 2 | North Carolina | 2 |
| Florida | 3 | Pennsylvania | 2 |
| Georgia | 2 | South Carolina | 3 |
| Louisiana | 2 | Tennessee | 4 |
| Mississippi | 2 | Virginia | 4 |

The 26 contractors operated in three physiographic regions and harvested either pine, pine and hardwood, or hardwood. Six operated in the mountains, 10 operated in the piedmont, and 10 operated in the coastal plain. The major forest types operated in were oak-hickory, oak-pine, loblolly-shortleaf pine, and longleaf-slash pine.

**Age, Education, and Experience**

All of the contractors were males between the ages of 29 and 62 with an average age of 43.3 years. Figure 4.1 illustrates the distribution of ages grouped by 5 year intervals from 26 to 61+ years. Seven contractors were between the ages of 36 and 40, the most frequent age category.

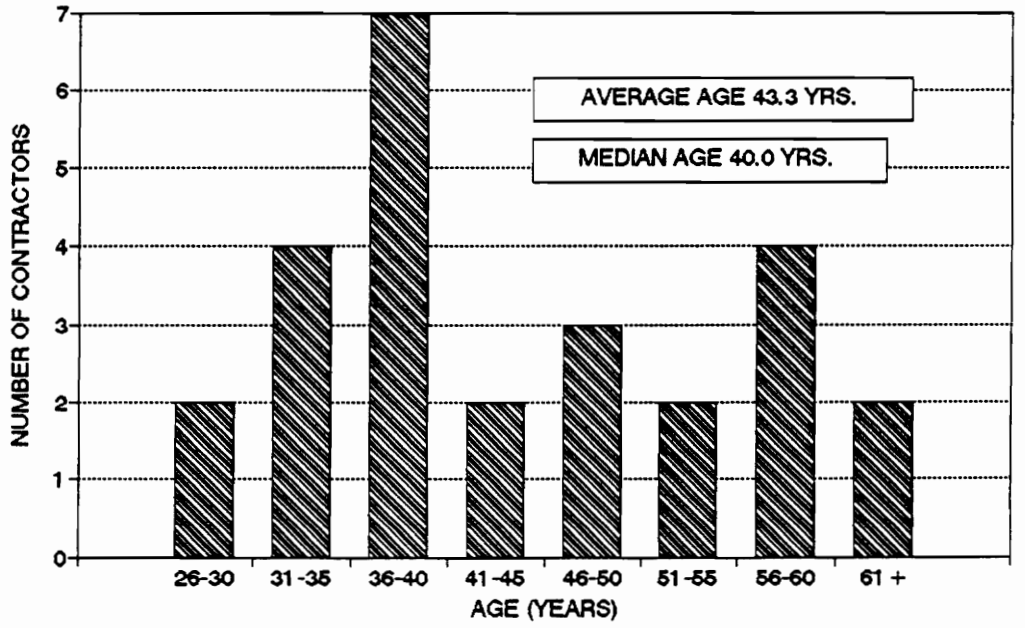



**Figure 4.1. Distribution of Ages For All Contractors Surveyed**

The average age and distribution of the ages of this group of contractors were similar to two other recent studies of logging contractors. Loving (1991) reports the participants in his study had an average age of 41 and the majority of the ages were between 35 and 39, and 40 and 44 years. (Six of the contractors in Loving's study were also participants in this study). "Timber Harvesting's" 1992 national survey of logging contractors reported 66% of all contractors were between the ages of 30 and 49 (Porter 1992).

The level of education varied widely with age, but the

majority of contractors were high school graduates (See Table 4.1).

**Table 4.1. Contractor Education**

| Number | Percent | Education |
|---|---|---|
| 3 | 12 | Less than a high school education |
| 13 | 50 | Completed high school |
| 4 | 15 | Completed high school and some college |
| 6 | 23 | Completed four-year college degree |

The three contractors without a high school education were all above 46 years of age, and all had entered the woods as teenagers to work with relatives (See Figure 4.2).

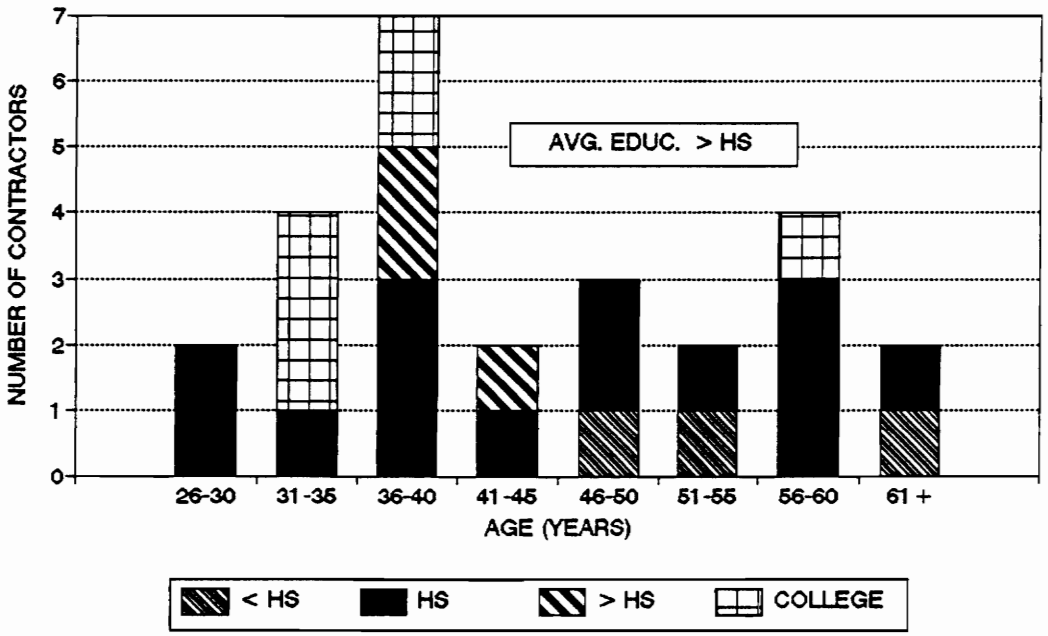



**Figure 4.2. Level of Education by Contractor Age**

Of the six contractors who completed a 4-year college degree, one had a degree in Geology, two had degrees in Forestry, and three had degrees in Business. Five of the six B.S. degree holders, were less than 40 years of age (See Figure 4.2). These results were similar to the education levels reported in the 1992 "Timber Harvesting" survey where the majority of the contractors had some form of education beyond high school (Porter 1992). Watson et al. (1987) survey of southeastern pulpwood logging contractors reported an average education level of 10.5 years with slightly less than 25 percent of the loggers not completing high school.

The number of years in business ranged from 3 years to 42 years with an average of 20.3 (See Figure 4.3). Seventeen of the twenty-six contractors have been in business for more than 16 years. Years in business for the contractors in this study was slightly higher than a previous survey of southeastern logging contractors that reported an average of 16.9 years in business (Watson et al. 1987). Thus, the participants in this study were more experienced than the "average" logging contractors in the southeast.

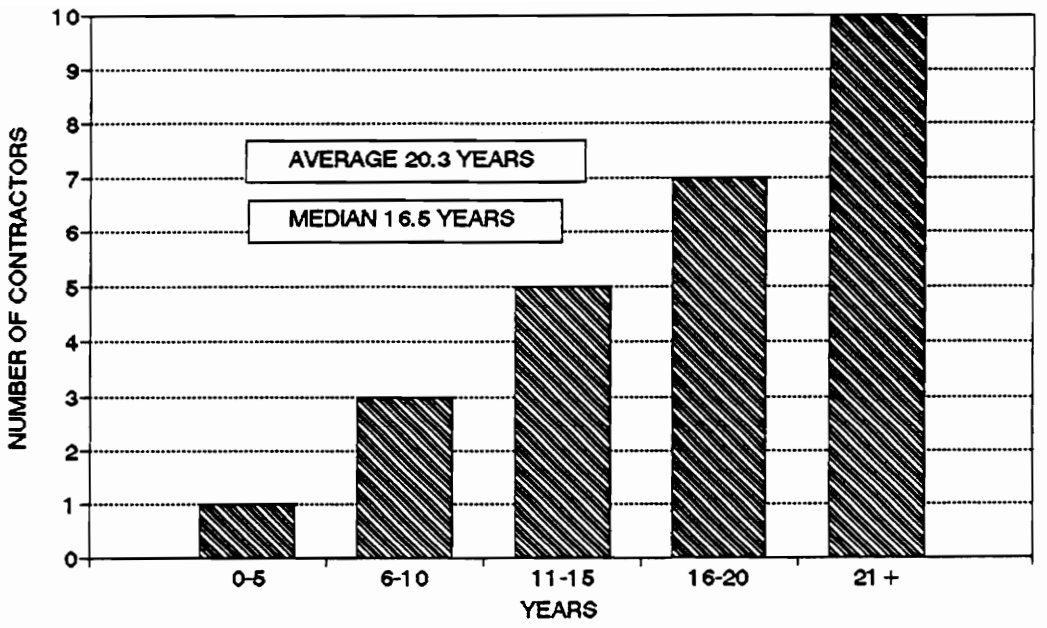



**Figure 4.3. Number of Years in Business**

There were 15 solely-owned operations (i.e. owned by one person and run with predominantly non-family employees), 10 family-owned operations (i.e. owned by more than one family member), and 1 company-owned operation. The number of family-owned operations was slightly lower than Loving's study that reported 13 family-owned operations among 24 participating contractors.

**Harvesting System**

The majority of the contractors (16) used clearcutting as the primary method of harvesting. Eight contractors used clearcutting and thinning throughout the year, and only two

exclusively thinned pine plantations. The percentage of thinning contractors in this study was lower than the 62% reported in the 1992 "Timber Harvesting" mail-in survey (Porter 1992). The difference in the data was mainly due to the geographical location of the participants of this survey. The "Timber Harvesting" survey was national in scope while this study concentrated mainly on the pine region of the southeast where clearcutting is the main silvicultural practice. Watson et al. (1987) reported 4.3 percent of southeastern contractors in their survey were exclusively thinning.

Thirteen of the contractors cut mostly pine, 11 cut a 50/50 mix of pine and hardwood, and two contractors cut primarily hardwood. The two contractors who cut primarily hardwood were located in Pennsylvania, and were also the only two operations to use motor-manual felling and cut-to-length grade log merchandizing.

The mechanization level for the twenty-six contractors was divided into three categories: motor-manual felling and limbing, mechanized felling with gate and motor-manual limbing, and fully mechanized felling with gate and mechanized limbing (i.e. CTR delimber). Nineteen of the contractors used mechanical felling with gate and

motor-manual limbing, five were fully mechanized, and two used motor-manual felling and limbing. The large number of contractors (73%) using mechanized felling with gate and motor-manual delimbing was similar to Loving (1991) who reported 75 percent the contractors using these methods.

Twenty-four contractors (92%) produced and hauled tree length wood and two produced cut-to-length sawlogs and pulpwood (i.e. the two hardwood loggers). Watson et al. (1987) reports 52 percent of southeastern contractors producing tree length and 34 percent producing shortwood. None of the 26 contractors in this study produced shortwood pulpwood. Twenty-one of the contractors performed all or most of their own trucking, and five contracted with trucking companies.

The contractors represented a full range of harvesting systems with different production levels. Production per contractor ranged from 97 tons per week (36.6 cords) to 6260 tons per week (2362 cords) with an average weekly production of 1600 tons (603.8 cords) (See Figure 4.4). Productivity per man-week averaged 64.3 cords, with a range from 9.2 cords to 141.5 cords. The wide range of production was influenced by smaller contractors harvesting hardwood in Pennsylvania and one large whole-tree chipping operation in

the coastal plain. Production for this group of contractors was higher than the 40.6 cords per-man-week reported by Watson et al. (1987). Thus, the contractors in this study produced more per-man-week than the typical contractors in the southeast.

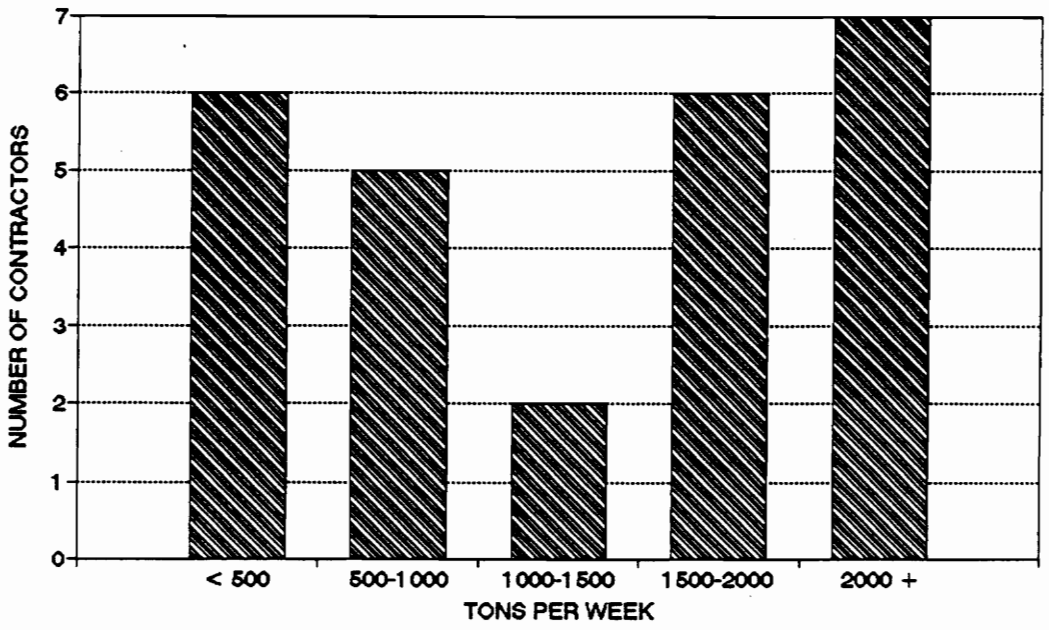



**Figure 4.4. Number of Contractors by Weekly Production**

Half of the contractors were on some form of quota during the year or wood order below the capacity of their harvesting system. The other half of the contractors operated without a quota or on a wood order at or near their harvesting system's capacity the entire year. The

contractors on quota averaged 1321.9 tons per week operating at 70 percent of their stated capacity, but the contractors producing without quota averaged 2607.4 tons per week operating at 90 percent capacity. The contractors without a quota were producing roughly 50 percent more per week than the contractors on quota. Capacity was calculated by dividing the average weekly production by the contractors estimate of potential weekly production.

Loving (1991) reports the average contractor was producing at 51 to 59 percent of maximum capacity. Capacity was calculated by a similar means and was significantly lower than the average of 70 to 90 percent in this study. The contractors in Loving's (1991) study were termed "above average" loggers in terms of production and overall financial stability, thus the contractors in this study appear to be better than average in terms of production and financial stability plus safety.

Increased financial stability and safety, among other things, results when logging capacity is sufficiently utilized (Laestadius 1990). He states that "Idle (logging) capacity carries many costs which do not show up directly on the books, however, such as escalating workers' compensation rates, increases in general liability insurance, demands for

best-management practices, and poor image of production forestry in general and the logger in particular."

## CREW DEMOGRAPHICS

### Age and Number of Employees

The 26 contractors employed a total of 190 male workers as machine operators, saw hands or truck drivers. Ages of the crew members ranged from 21 to 57, and the average was 37.0 years (See Figure 4.5). The majority of the crew members were between the ages of 36 and 40 which was similar to the contractor's age distribution. The age data was slightly skewed to the right, with the majority of the employees being less than 40 years of age. Sixteen percent of the workers were between the ages of 21-25, the least experienced category, which indicates young people are still entering the woods for employment.

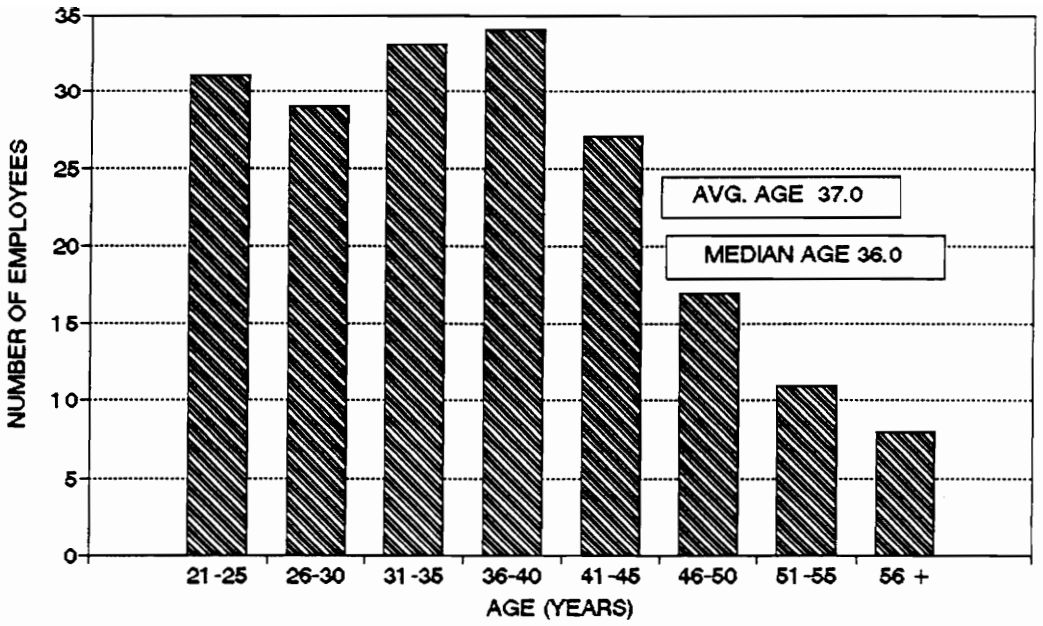



**Figure 4.5. Age Distribution for all Employees**

Classification of the employees by job category indicates a high level of mechanization for the contractors in this study (See Figure 4.6). One indication of the level of mechanization was the low number of motor-manual fellers and the high number of feller-buncher operators. Only three workers, all on hardwood logging operations, felled timber with chain saws, while 27 workers operated feller-bunchers daily. Another indication of the mechanization level for this select group was the number of grapple skidders versus cable skidders. Only three contractors utilized cable skidders; two hardwood contractors and one tree-length pine

contractor operating in the mountains. The number of grapple skidders was higher than reported in a earlier survey of southeastern loggers where 42 percent of the loggers used grapple skidders and 37 percent used cable skidders (Watson et. al. 1987). Five operations were termed "fully mechanized" utilizing mechanical felling and delimbing (i.e. CTR Delimber), and required no one to be on-the-ground to operate chain saws daily. Some of the more productive mechanized jobs used more than one feller-buncher to fell and operated two loaders simultaneously at the landing.

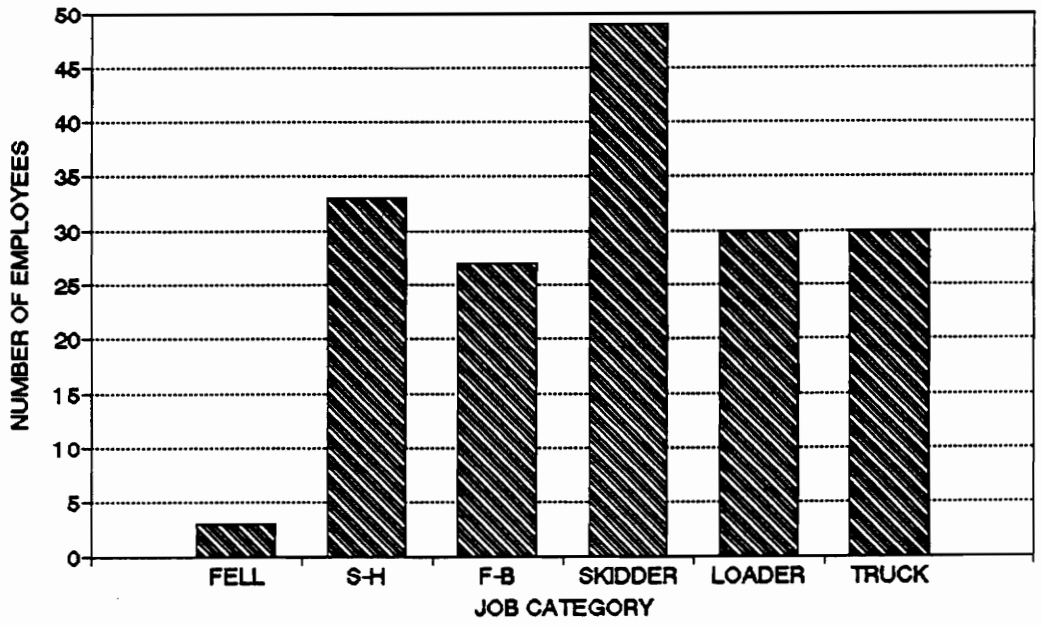



**Figure 4.6. Distribution of Employees by Job Category**

**Tenure**

Employee tenure, defined as the number of years the employee has been with the current crew, ranged from less than 1 year to 25 years with an overall average of 7.4 years and a median of 6 years (See Figure 4.7). Many of the workers had prior in-woods experience before joining their current crew, but the data on years of prior work experience for each employee was not available for all employees in the study. In addition, many contractors felt new men with or without experience needed time to adjust to their crew and method of operating. Roughly 55% (105) of all the employees had more than 5 years tenure with the current crew (See Figure 4.7).

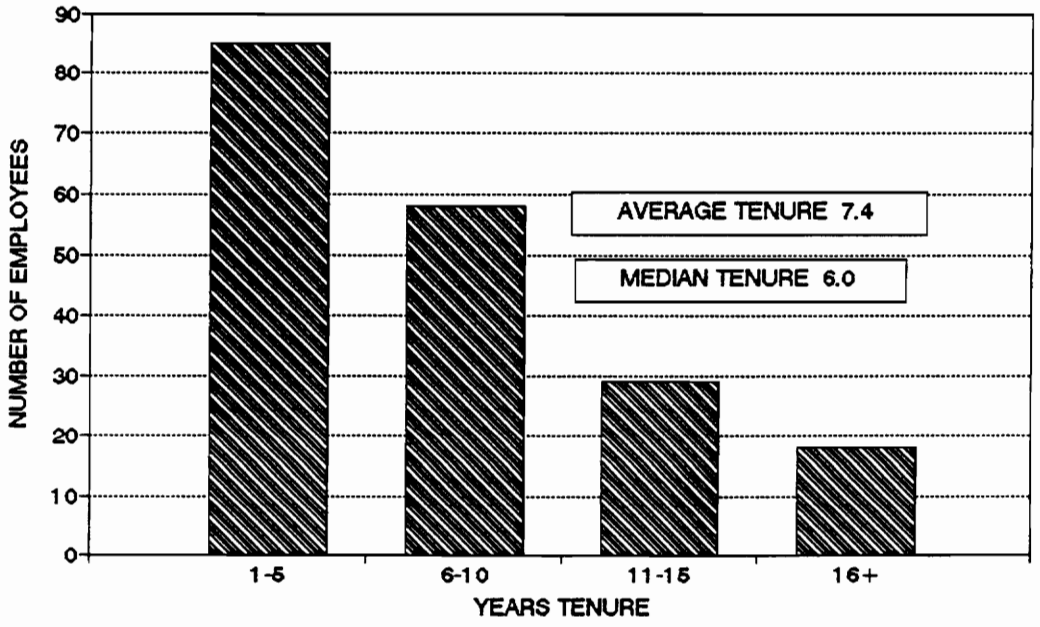



**Figure 4.7. Number of Employees by Years Tenure**

Crew tenure also correlates with the number of years in business for each contractor and job position. As Figure 4.8 illustrates, the longer the contractor has been in business the longer the average crew tenure.

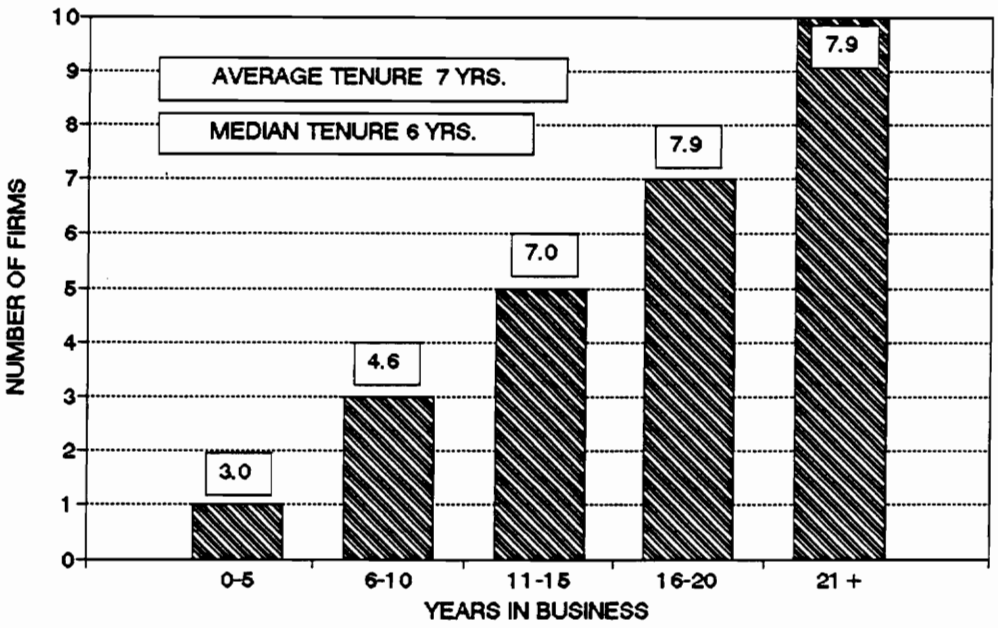



**Figure 4.8. Average Employee Tenure Based on the Contractor's Years in Business.**

When graphed against job position, crew tenure was shortest for the less skilled positions (See Figure 4.9). Saw-hands, who were considered the least skilled and usually the lowest paid workers on mechanized operations, had the shortest average tenure for the five job categories. Figure 4.10a reveals the distribution of saw hands over years tenure was heavily weighted (52%) toward employees with three or less

years on the job. Saw hands were also the employees with the most exposure to potential accidents. Wilson (1989) reports over half the reported injuries occurred while stumping, topping, or limbing with chain saws. One contractor utilizing mechanical felling with gate and motor-manual delimbing stated that "My saw hands are my biggest concern. They have to watch out, and I tell them that every day."

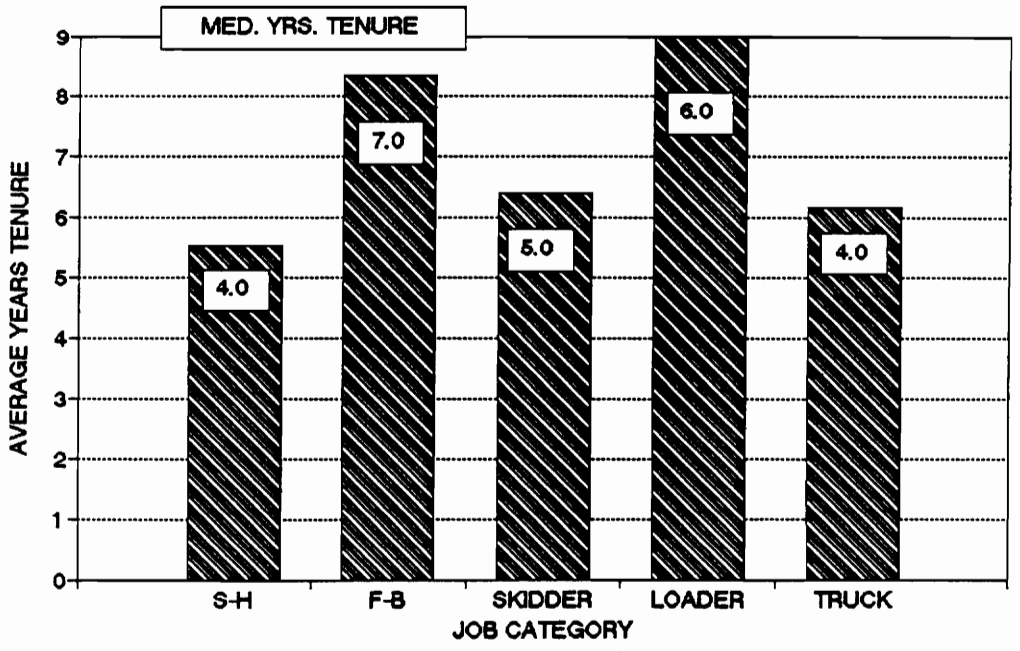
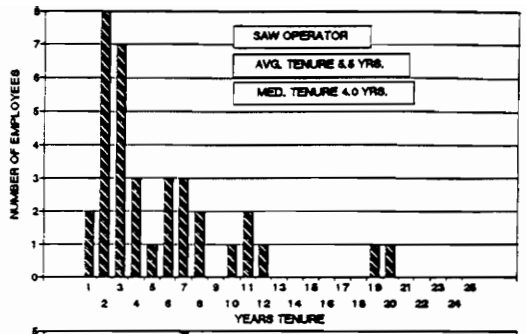



**Figure 4.9. Average Employee Tenure by Job Category**

A.

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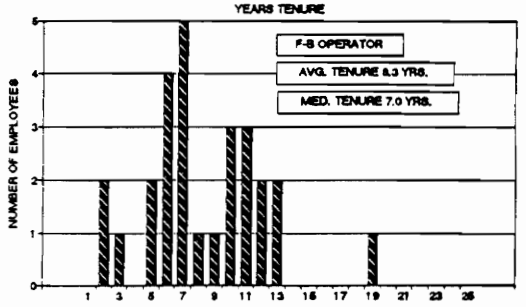


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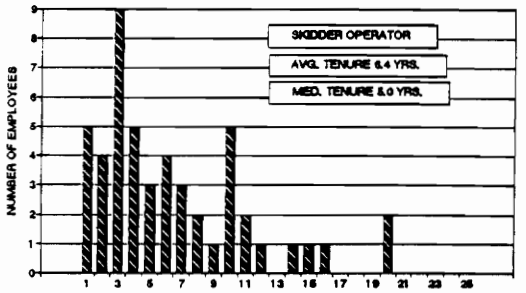
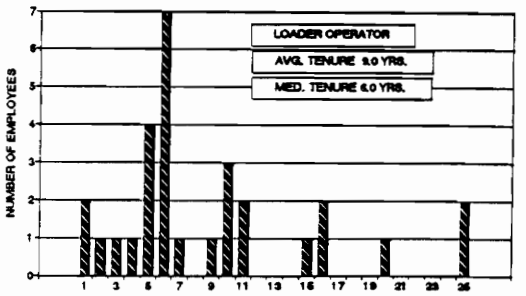



D.




E.

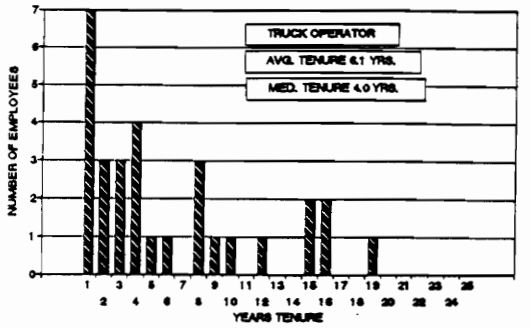



**Figure 4.10. Distribution of Employee Tenure by Job Category**

Truck drivers had the next lowest average tenure (See Figure 4.9). Several contractors mentioned that truck drivers were the hardest employees to retain, because they had to compete with over-the-road trucking firms that are able to pay higher wages. Many contractors stated that they could retain their current truck drivers because they were married and enjoyed coming home every evening. Truck drivers were spread across most of the range of years tenure with the largest number having one year or less service with the current contractor.

Skidder operators had an average tenure between the highest and the lowest (See Figure 4.9). Most skidder operators were considered to be skilled employees by the contractors, any many contractors felt they would be hard to replace with new employees. One contractor operating three grapple skidders on one crew stated that "My skidders and skidder operators are key to keeping my production flow smooth. When the deck is full they go for longer skids or delimb through the gate a little more to keep the deck clean. Its not something I told them, they're just damn good operators." Figure 4.10c indicates most of the skidder operators (60%) have between 3 and 10 years experience with the current crew with most of the operators in the three years tenure category.

The employees with the longest tenures were associated with the skilled jobs such as feller-buncher operator and loader operator (See Figure 4.9). These positions were sometimes used for promotion from within the crew and reserved for "key employees." "Key Employees" were typically more experienced, long-tenured, and more dependable than the average employee. On family run operations, the feller-buncher operator and/or loader operator was often a family member. Usually the loader operator or the feller-buncher operator was the designated foreman when the owner was away from the job. As figures 4.10b and 4.10d illustrate there were only a few feller-buncher operators and loader operators with less than 3 years experience with the current crew. The majority of the feller-buncher operators (78%) had between 6 and 10 years experience. Loader operators were scattered across the full range of years tenure from less than one year to 25 years.

Figure 4.11 illustrates the percent of employees by job position for each tenure category. Truck drivers were removed to better focus on the large number of in-woods workers.

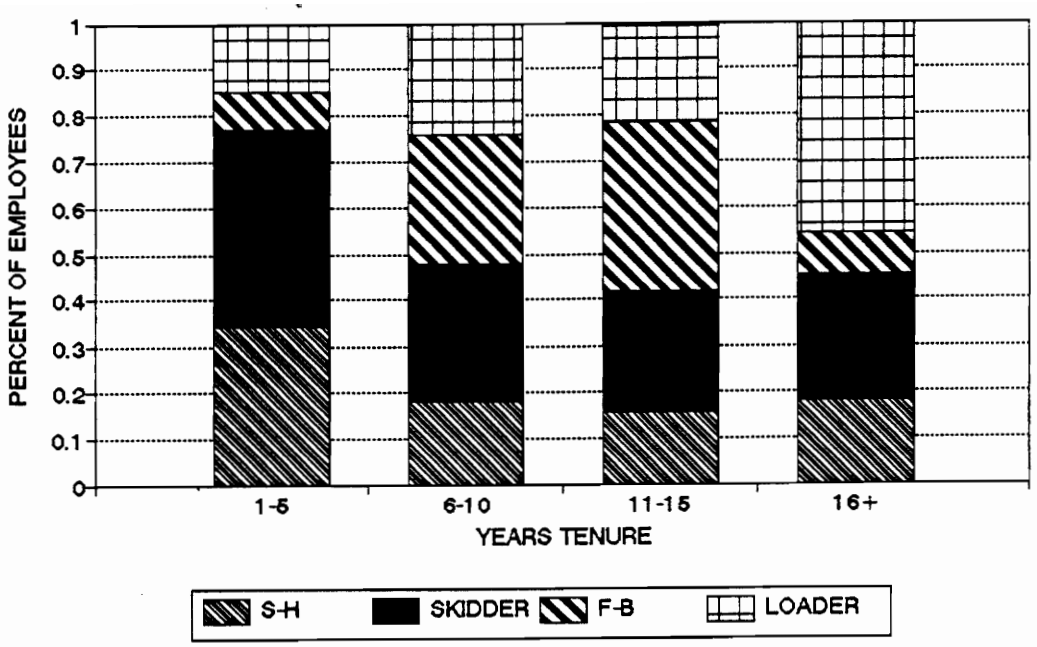



**Figure 4.11. Years Tenure by Job Category on a Percentage Basis**

The graph indicates that saw-hands and skidder operators comprised 75% of employees with less than 5 years tenure. This percentage steadily decreases to roughly 40% after tenure increases past five years. However, the opposite was true for the feller-buncher and loader operators; they make up 25% of all employees with less than 5 years tenure, but increase to 57% of the employees with greater than 16 years of tenure.

## CREW ORGANIZATION AND MANAGEMENT

### Organization

The number of separate crews working for each contractor ranged from 1 to 3 with the average being 1.4 crews per contractor. Seventeen of the contractors operated with one crew, eight with two crews, and one with three crews. The average number of employees per contractor was 9.45, and ranged from 3 to 30 employees. One contractor in this study employed 30 people: 23 in-woods workers and truck drivers, 4 mechanics, and 3 office workers. Twenty-three of the contractors (88%) employed a total of 12 or fewer employees.

The number of in-woods employees averaged 8.8 with a range from 3 to 16. The average crew size of 6.4 men (median of 6 men) was similar to Loving's (1991) study which reports a median crew size of 5.5 men. Crew size was smaller for the contractors operating in the mountains (2-6 men per crew) and larger for those in the coastal plain (6-16 men per crew). Crew size was also heavily dependent on the delimbing process used by the contractor. One contractor with a crew of 16 men employed 5 men delimbing with chain saws.

The average number of days worked per week was 4.9 (ranging from 3 to 6 days), and the average number of hours worked per week was 45.8. The number of days worked depended primarily on whether or not the contractor was restricted by a production quota or a small wood order. Some of the contractors on quota only worked 3 full days, while those not bound by quota usually worked 4.5 to 6 days.

**Method of Payment**

The majority (61%) of the contractors paid their employees on some form of hourly basis. Many felt paying an hourly or daily wage was fairer to the workers since their income was not tied directly to the daily production, which could be influenced by weather, quota, etc. factors beyond their control (See Table 4.2). These contractors also stated that their crew operated safer and was easier on equipment since they were not being pushed to meet a daily production goal. Truck drivers employed by the contractor were typically paid on an hourly basis for safety reasons. Some of the contractors guaranteed a certain portion of the workers weekly salary if weather or other circumstances prevented the operation from working. Eight contractors paid their "key employees" a guaranteed weekly salary regardless of

days worked. The number of contractors paying by the hour was similar to Loving (1991) who states 11 of the 24 contractors paid an hourly wage.

**Table 4.2. Method Of Crew Payment**

| Number Of Contractors | Method Of Payment |
|---|---|
| 12 | Hourly |
| 4 | Hourly Plus Weekly Bonus |
| 4 | Daily Salary |
| 5 | Production |
| 1 | Production Plus Weekly Bonus |

It was interesting to note that contractors who paid on production basis also felt it was a fairer method of payment since the workers earned more due to the incentive to produce. These contractors stated that production incentive payment might affect safety and equipment use on other jobs, but their crews worked safely because they were more experienced and knew how to operate equipment properly.

Industrial safety literature supports the theory that the hourly wage method of payment has an effect on safety compared to a production-based payment method. In a controlled study where subjects operated a punch press, McKelvy (1973) found a piece-rate pay system resulted in

significantly higher production, as well as a significantly higher rate of unsafe behaviors. Most of the contractors paid on a production basis at one time or another, but stated it was better in the long run to pay an hourly wage. Similar thoughts on method of payment were reported by the Department of Labor (1984) who cite "Several workers stated they felt piecework encouraged unsafe practices since they had to work fast as possible to make what they considered a living wage." The short amount of time spent with each contractor did not allow the study to develop a comparison between the two types of payment.

**Supervision**

The supervisory role that the owners played were grouped into three categories. Thirteen of the contractors saw their role as full-time woods supervisors (i.e. the owner operated machinery daily and was part of the production crew), 8 were part-time office/woods supervisors (i.e performed mostly managerial work in the office and visited the operation regularly), and 5 were part-time woods supervisors (i.e. monitored woods crew daily, but did not operate machinery). Contractors who spent more time in the office, stated that they visited the job daily or they could

be on the job quickly if needed. Six of the eight contractors classified as part-time office/woods supervisors produced over 2000 tons per week, and were typically engaged in business meetings/activities throughout the day. Contractors who were part-time woods supervisors worked mostly in the woods and typically acted as a foreman, performing maintenance and running for parts. On a daily basis, they did not operate machinery unless a man was out or extra production was needed. Twelve of the contractors had full-time foreman who were responsible for supervising the in-woods operations. Eleven of these foremen were employed by contractors classified as part-time office/woods supervisors. The high number of contractors classified as full-time woods supervisors was similar to Loving (1991), who reports 15 of the 24 contractors interviewed could be classified as full-time in-woods supervisors (i.e. Owner acts as working supervisor, dividing time between supervision and production work).

The method of supervising their crew was also grouped into three categories. Seventeen of the contractors (65%) classified their method of supervising their employees as "The men supervise themselves", seven replied "The men are loosely supervised", and two replied "The men are closely supervised." All the contractors who replied "The men

supervise themselves" felt their crew was experienced, had worked together for several years, and tended to watch out for each other. One contractor replied "If I was to start telling my men what to do, they'd think I was hassling them..... My men know what to do and do it." One of the contractors who replied "Men are closely supervised" was cutting grade hardwood and supervised the bucking of each log in order to maximize profits. The other contractor who supervised closely felt his "crew was not capable of operating when he was not on the job," and he often shut down his job on the few days a year he was personally unable to work.

**Training**

Only four of the contractors interviewed had some form of job training, seven had some form of safety training, and seven held regularly scheduled safety meetings as part of a mill or insurance safety program. Two of the contractors with job and safety training were members of NORTIM, a risk-management company which provides general liability and workers compensation insurance, along with safety and production training for loggers. The other two contractors with safety training stated they put new workers with the

most experienced crew members to show them how the crew operates. The most common forms of safety training were classes in First-Aid and CPR. The low number of contractors having formal safety training for their crews was similar to Loving (1991) who reported none of the 24 participating loggers in his study had formal safety training.

The contractors that conducted regularly scheduled safety meetings tended to have larger crews (i.e. 6 or more members) and felt it necessary to gather everyone together to discuss safety. When the meetings were held they usually discussed safety topics on their operation or examples of reported accidents (i.e. published accident reports, newspaper articles etc.) on other logging operations. Those contractors who did not conduct frequent safety meetings said they discussed safety with the individual crew members or when a problem arose. Many of the contractors employing only a few men felt it unnecessary to schedule meetings since it was easier to address things as they occurred. Generally, safety training and safety meetings were more regular when the insurance companies were closely involved. Although safety and job training was absent from most of the operations, contractor interest in training was very high.

## Crew Selection

The method of selecting new crew members was also grouped into categories based on the response given by each contractor. The two most common selection techniques were hiring based on "previous knowledge" of the potential employee and their previous "work experience." All other techniques listed in Figure 4.12 were used by less than 10 contractors and some used more than one of the listed techniques.

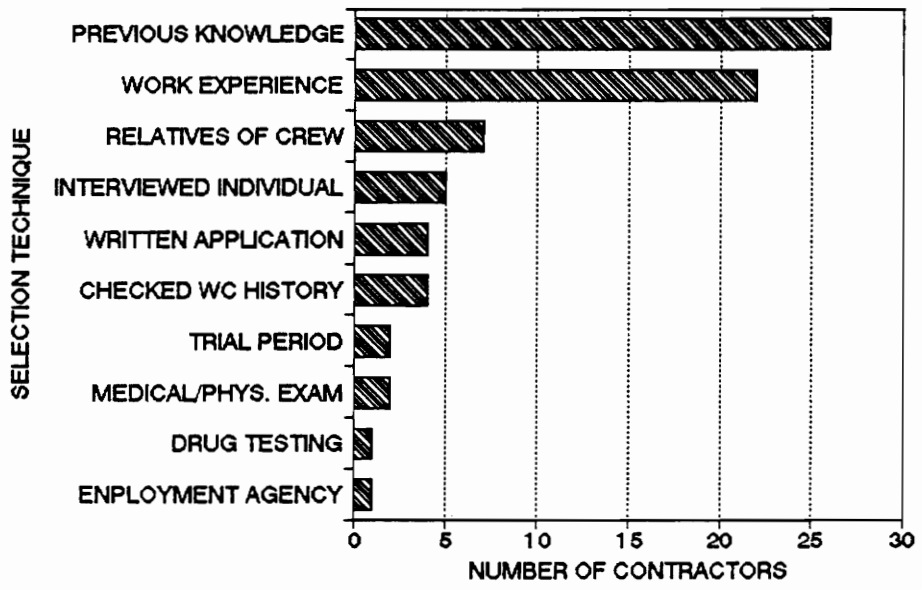



**Figure 4.12. Crew Selection Techniques**

Many of the contractors in this survey had small waiting lists of potential employees who were currently working for other loggers but wanted to join their crew. One contractor

had so many woods workers inquiring about jobs he used a employment agency to screen potential employees whenever a position opened. In general, all of the contractors stated they had "no problem" obtaining good labor with the exception of truck drivers. Many contractors felt hiring only employees with previous "work experience" and ones that they had "previous knowledge" about contributed to overall crew safety. One contractor stated that "I run a good job, that's why people want to work for me, which makes getting a new man with experience easier." Another contractor with a similar view point on selection stated that "Selecting a good man is not hard, when you have good men who want to work for you." When hired, these individuals tended to "fit in" with the existing crew quicker.

**Benefits**

The data on crew benefits offered by the contractors are summarized in Figure 4.13. Some contractors provided more than one of the benefit options listed. The three most frequently offered benefits were transportation to the job, paid holidays, and paid vacations. The top three benefits provided for this study were also in the top five benefits listed by contractors in the 1992 "Timber Harvesting" survey

(Porter 1992) and Loving's (1991) study. Other commonly provided benefits included year-end bonuses, health care, money advances, etc. Some employees received more benefits than others depending on years of tenure, family or non-family status, job position, and other criteria deemed important to the contractor.

No significant trends were found in the type or number of benefits provided by the contractor based on age, education, or geographical location. As a group however, these contractors recognized the importance of a stable/ experienced crew, and tried to pay slightly higher wages and offer more benefits to their employees than average for their operating area.

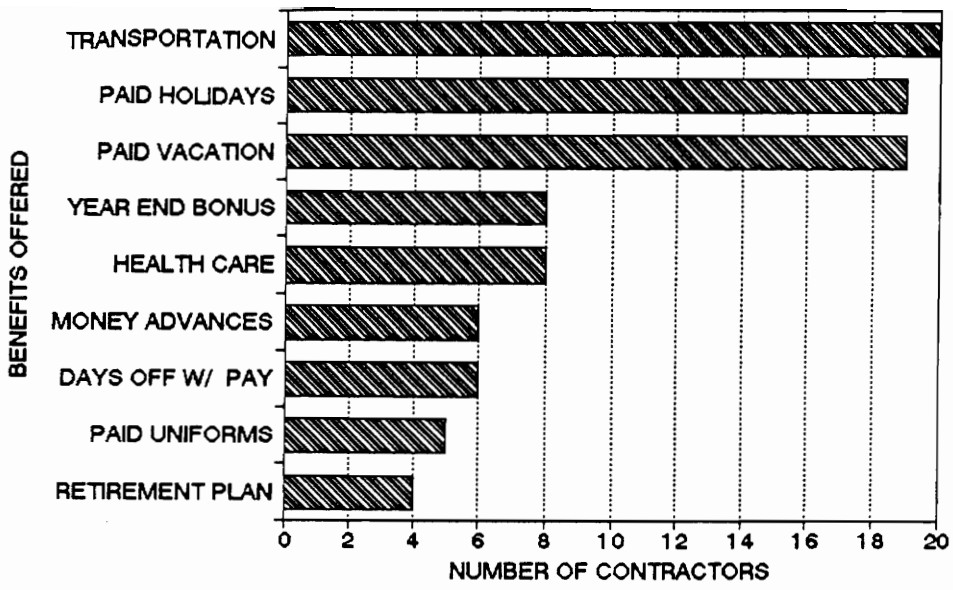



**Figure 4.13. Crew Benefits Offered by Contractors**

**Safety Equipment**

Personal protective equipment provided by the contractor for the employees varied, but all twenty-six contractors provided hard hats, eye protection, ear protection, and saw chaps. Seven provided steel-toed boots and seven provided gloves at no cost to their employees (See Figure 4.14).

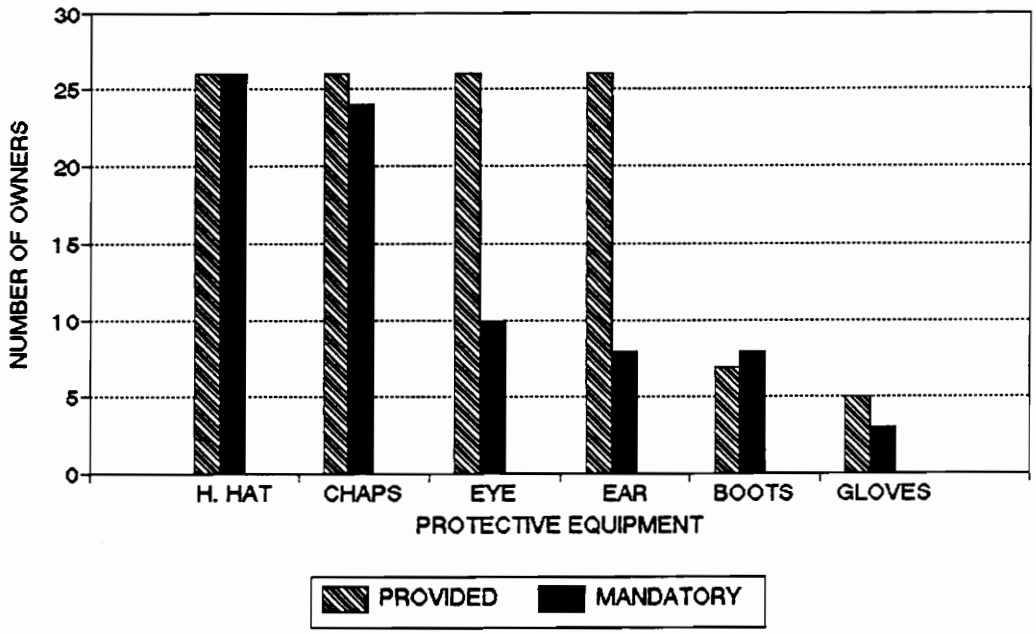



**Figure 4.14. Mandatory Personal Protective Equipment and Contractor Provided Personal Protective Equipment.**

Personal protective equipment that was mandatory for employees working on the job site also varied (See Figure 4.14). All twenty-six contractors required hard hats, 24 required chaps (when operating a chain saw), 10 required eye protection, 8 required ear protection and steel-toed boots, and 3 required gloves to be used. The number of contractors requiring ear and eye protection was significantly higher than reported by Loving (1991) who reports none of the 24 loggers in his study required ear and eye protection. Some differences in opinion over personal protective equipment arose during the interviews with the contractors. One

contractor was "against ear protection" because he felt the worker must be able to hear to be safe in the woods while another contractor favored it due to long-term exposure which could cause hearing loss.

The mandatory wearing of personal protective equipment usually depended on the employee's job position or function. For example, all employees might be required to wear hard hats, but only chain saw operators were required to wear chaps when operating chain saws. None of the contractors required hard hats be worn when the man was inside of a machine cab, but all required hard hats be worn when on the ground. In practically all cases, the personal protective equipment that was required to be worn was observed during the field visits.

## ACCIDENT ANALYSIS

### Accident Frequency

A total of 91 reported accident claims that incurred workers' compensation payments were reported for the 26 logging contractors in this study. The amount of insurance information pertaining to the accidents varied from

contractor to contractor. In some cases, loss run sheets were obtained from insurers which indicated the type accident and the exact cost for each. In other cases only the number of accidents and total cost per year were obtained. The majority of the reported accidents and costs reported by the contractors were verified through insurance information. However, data on reported accident costs could not be verified for eight of the contractors. The lack of unified or consistent insurance information was also encountered by Wilson (1989) who reports the need for further development to facilitate safety information transfer to improve loss control programs.

Twenty-three contractors reported that they did not pay for accident related expenses without filing a workers' compensation claim, and three reported they occasionally paid for minor accidents in which no claim was filed. These three contractors paid for roughly seven minor accidents and stated it was less expensive and problematic to pay for the accidents than to report them to the insurance company. The decision to pay the medical expenses themselves rather than file a claim depended on the employee involved and the probability that a serious claim could result from the accident. The number of accidents not turned into insurers was significantly lower than Loving and Stuart (1991)

reported in which 22 of 24 contractors paid for small medical expenses, rather than turn them into their insurer.

Three contractors accounted for 56 (62%) of the 91 claims reported. Of these 56 accidents, 37 resulted in no lost time and 19 incurred one or more days of lost time. These particular contractors were larger than average, employing an average of 16 workers each, and stated that they reported all accidents because of liability concerns. The seemingly high number of claims was the result of conservative reporting practices rather than a high accident frequency compared to other contractors. An unusually high number of accident claims due to reporting practices was also found by Loving and Stuart (1991), who stated that the contractor with the highest experience modification factor claimed that his workers' compensation insurer encouraged filing claims for all accidents, regardless of the severity of the accident.

For the 26 contractors interviewed the number of accidents per 1000 man hours worked was calculated to remove the variability of crew size. This accident frequency ranged from 0 to .28 with an average of .05 accidents per 1000 man hours. This translates into roughly one accident for the 190 employees every two and a half weeks assuming an average

work week of 45 hours.

There were 48 accidents per 100 workers for the five year period from 1987 to 1991, with an average of 9.6 accidents per year. This was roughly one-half the number of injury cases reported by OSHA's national logging industry survey between 1980-1985 (APA 1991). OSHA stated a yearly average of 20.67 reportable cases per 100 workers based on 1750 respondents. No deaths were recorded on any of the jobs visited since the contractors had been in business. OSHA reported 205.8 deaths per 100,000 workers per year between 1980 to 1985. These statistics verify that this group of 26 contractors were indeed "safety successful."

**Accident Cost**

Using the available cost data for 78 of the 91 reported accidents, the direct cost of accidents reported to insurers ranged from $65 to $122,088 with an average cost of $ 1761 and a median of $1360 per accident (See Figure 4.15).

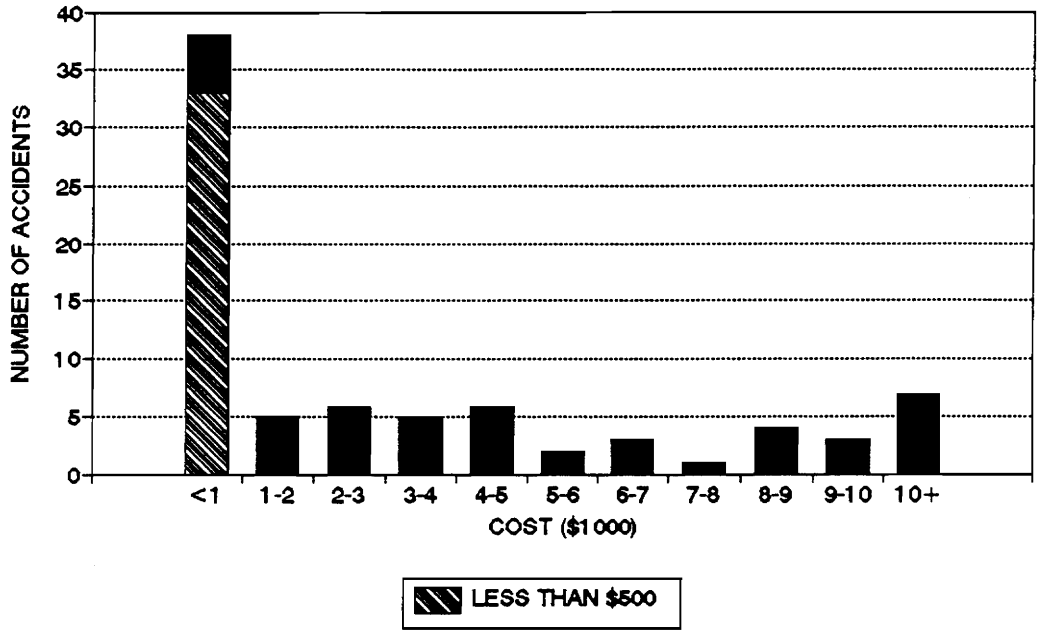



**Figure 4.15. Number of Accidents by Cost ($1000 increments).**

A large portion of the accidents (33 of 91) were less than $500 and tended to be bruises, light sprains, and small cuts. Four of the 33 claims incurred no compensation, but were reported by two contractors and entered in the insurance company data. The accidents in the $1000 to $10,000 category tended to be larger cuts, small fractures, and twisted joints which incurred higher medical fees and wages for the absent worker. The $10,000 and greater category was made up of broken legs and back injuries which required or involved repeated visits to the doctor and wages for extended periods of lost time. Four of the seven claims in this category were over $50,000. Back injuries made up

10.5 percent of the accidents by body part (See Figure 4.19), and 60 percent of the accident claims over $9000 (See Figure 4.15).

**Individual Accident Analysis**

During the interview process the contractors were able to recall and describe 20 accidents that had occurred in the recent past. These accidents tended to be the more serious accidents that occurred. A description of the location, body part affected, type of accident, and the employees occupation are presented in matrix format in Figure 4.16. Locations of the accidents on the job site are represented in the matrix by "X" if they occurred in-woods, "O" at the landing, and "R" on the road. The matrix is read vertically to follow a description of each accident. For example, accident number one was caused by a spring pole hitting the cutters foot. The matrix is read as follows:

Source - Hit by Limb/Tree
Body Part - Leg/Foot
Nature - Fracture
Occupation - Limber/Bucker

ACCIDENT DESCRIPTION

| | 1 Spring Pole Hit Foot, Limbing | 2 Motor-Manual Felling | 3 Motor-Manual Felling | 4 Saw Cut, Limbing | 5 Hit By Top, Trimming Truck | 6 Hit By Falling Branch, Limbing | 7 Lifting Loading Truck Ramp | 8 Slipped And Pulled Back | 9 Fell On Log, Limbing | 10 Saw Cut, Limbing | 11 Fell On Log, Limbing | 12 Burned Checking Fuel | 13 Fell Climbing On Machine | 14 Hyd. Cyl. Fell On Foot | 15 Hit By Limb, Limbing | 16 Spring Pole Hit Foot, Limbing | 17 Battery Explosion | 18 Fell On Log, Limbing | 19 Hit By Top, Trimming Truck | 20 Rolled Truck Over On Road |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SOURCE** | | | | | | | | | | | | | | | | | | | | |
| SAW CUT | | | | ● | | | | | | ● | | | | | | | | | | |
| FELL ON LOG/TREE | | | | | | | | | ● | | ● | | | | | | | ● | | |
| HIT BY LIMB/TREE | X | X | X | | ● | X | | | | | | | | | ● | ● | | | ● | |
| TRUCK | | | | | | | | | | | | | | | | | | | | R |
| MAINTENANCE | | | | | | | ● | ● | | | | ● | ● | ● | | | ● | | | |
| **BODY PART** | | | | | | | | | | | | | | | | | | | | |
| BACK | | | | | | | ● | ● | | | | | | | | | | | | |
| MULT. INJURY | | | X | | | | | | | | | | | | | | | | | R |
| LEG/FOOT | X | | | ● | | | | | ● | ● | ● | | ● | ● | | | | ● | ● | |
| HEAD/NECK | | | | | | | | | | | | ● | | | ● | | ● | | | |
| ARM/HAND | | X | | | ● | X | | | | | | | | | | ● | | | | |
| **NATURE** | | | | | | | | | | | | | | | | | | | | |
| SPRAIN/STRAIN | | | | | | | ● | ● | | | | | | | | | | | | |
| CUT | | | | ● | | | | | | ● | | | | | | | | | | |
| FRACTURE | X | X | | | | X | | | | | ● | | ● | ● | | ● | | ● | | |
| CONTUSION | | | | | ● | | | | ● | | | | | | ● | | ● | | | |
| MULT. INJURY | | | X | | | | | | | | | | | | | | | | | R |
| BURN | | | | | | | | | | | | ● | | | | | ● | | | |
| **OCCUPATION** | | | | | | | | | | | | | | | | | | | | |
| TRIMMING | | | | | ● | | | | | | | | | | | | | | ● | |
| TRUCK | | | | | | | | | | | | | | | | | | | | R |
| LIMB/BUCK | X | | | ● | | X | | | ● | ● | ● | | | | ● | ● | | ● | | |
| MAINTENANCE | | | | | | | ● | ● | | | | ● | ● | ● | | | ● | | | |
| FELLING | | X | X | | | | | | | | | | | | | | | | | |

X- In-woods ●- Landing R- Over the Road

**Figure 4.16. Accident Description Matrix.**

**Accident Location**

As shown in Figure 4.17, seventy-five percent of the accidents occurred on the landing while 20 percent occurred in the woods. This data was significantly different than previous reports on logging accidents where 66 percent of all logging accidents occurred at the cutting site and 14 percent occurred at the landing for eastern states which included Arkansas, Kentucky, Maine, North Carolina, Tennessee, Vermont, and Virginia (Department of Labor and Bureau of Labor Statistics 1984). The large shift in accidents to the landing observed in this study was primarily because these pine tree-length operations used mechanical felling equipment and the limbing and bucking, as well as machine repair and maintenance, typically took place at the landing instead of at the stump. Motor-manual bucking was almost completely eliminated due to the 24 contractors utilizing tree-length harvesting methods.

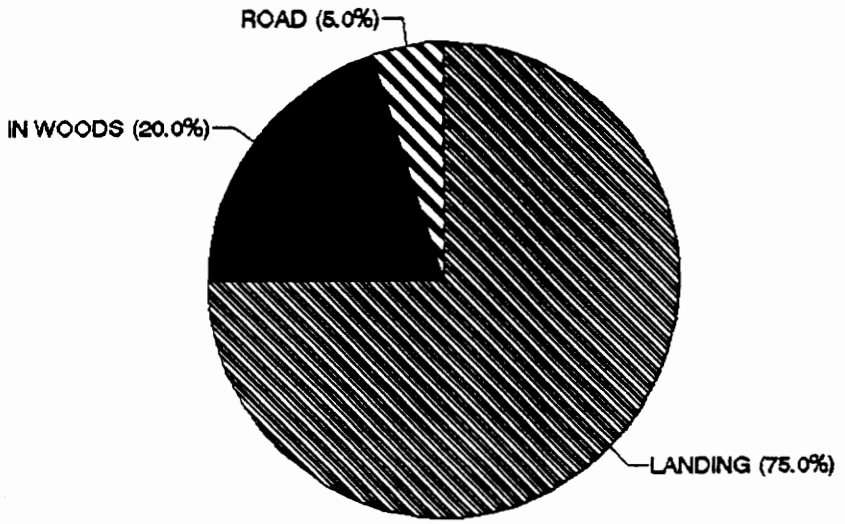



**Figure 4.17. Percentage of Accidents By Location on the Job Site**

Two of the four in-woods accidents occurred on the two hardwood logging operations while limbing at the stump. The other two in-woods accidents occurred on mechanized operations during motor-manual felling of trees which could not be cut with the feller-buncher. Several of the mechanized loggers mentioned that felling trees motor-manually was dangerous for their crews because it was a relatively rare event (on a daily basis). One mechanized contractor stated "Men who are still good with a saw (felling trees) are few in this area." The data in this study supports the opinion that mechanized operations tend

to be safer, and working with a chain saw continues to account for a high percentage of accidents reported. Twelve of the twenty accidents occurred while felling, limbing, bucking, or topping with a chain saw.

**Accident Source**

As shown in Figure 4.18, 40 percent of the accidents were the result of being "Hit by Limb/Tree." Once again all of these accidents occurred while motor-manually felling or limbing/bucking with a chain saw. On most tree-length mechanized operations, Limbing/Bucking was usually the only task where chain saws were used and the only job where men worked on the ground the majority of the day. The combination of being on the ground and working with chain saws resulted in the highest accident frequency.

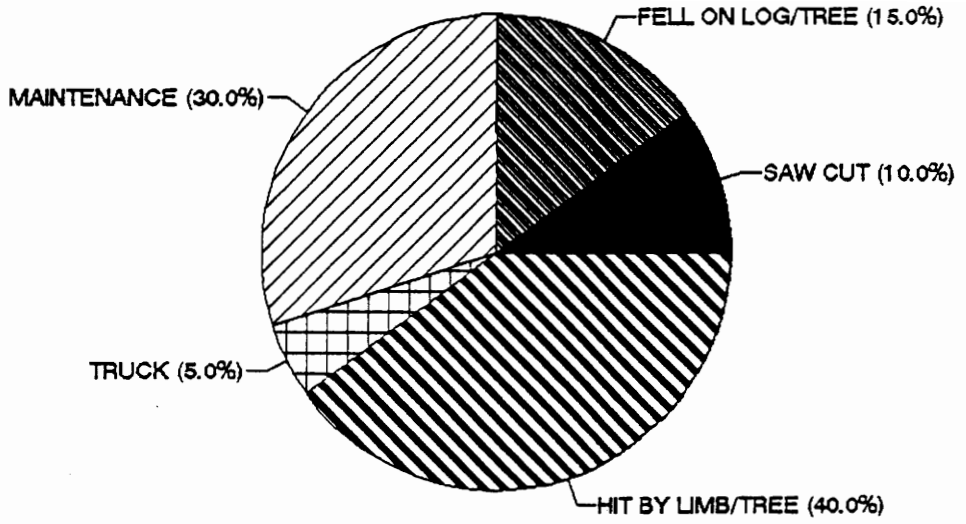



**Figure 4.18. Percentage of Accidents by Source**

The large number of maintenance related accidents (30%) also reflects the change from more manual operations to mechanized harvesting operations. Accidents on mechanized operations tend to occur during secondary tasks (i.e. maintenance) not directly related to the actual production. Laflamme and Cloutier (1988) found that a decrease in frequency of occupational accidents in the logging industry was a positive outcome of mechanization, and workers were hurt while performing maintenance and repair tasks rather than production tasks. Their data indicated that the average individual risk on mechanized sites was almost three

times lower than on conventional ones.

**Body Part Injured**

Figure 4.19 illustrates that the leg/foot body part was the most frequently injured (45%). This was slightly more than the Bureau of Labor (1984) statistics which show 34 percent of all logging accidents injured the lower extremities. Three of the nine leg/foot injuries in this study were the result of falling while working on or around trees being delimbed. Preventing these types of accidents is difficult since the environment of the saw hand is varied and uncontrollable. The only real long-term solution is to replace motor-manual delimbing with mechanized delimbing. Five contractors have purchased mechanized delimbers (i.e. CTR delimber) and many of the other contractors were considering this move. The contractors mentioned that purchase of a mechanized delimber was expensive, but they felt it would pay off in the long-run because fewer saw hands were required and fewer accidents would occur resulting in lower workers' compensation premiums.

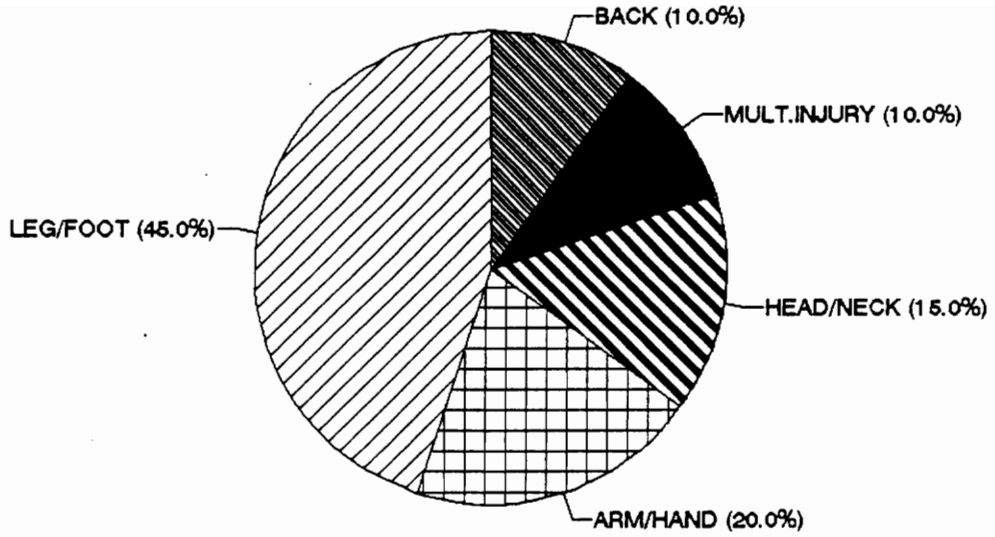



**Figure 4.19. Percentage of Accidents by Body Part**

The low number of saw cuts to the leg/foot was probably influenced by the increased use of saw chaps and the use of mechanized felling and delimbing for tree-length logging (See Figure 4.19). Saw chaps were required and worn on 24 of the 26 operations visited. Some of the contractors kept chaps with cuts in them as examples of there effectiveness. The two saw cuts (10% of the source of accidents) was lower than the Department of Labor and Bureau of Labor Statistics (1984) data which indicate that chain saws were the source of 29 percent of the accidents on logging operations in eastern states.

**Nature of Injury**

The type or nature of the accidents (See Figure 4.20) were fairly evenly distributed except for fractures. Fractures made up 40% of the injuries and ranged from a broken finger (enabling the employee to return the following day) to a broken lower leg causing the employee to be absent for several weeks.

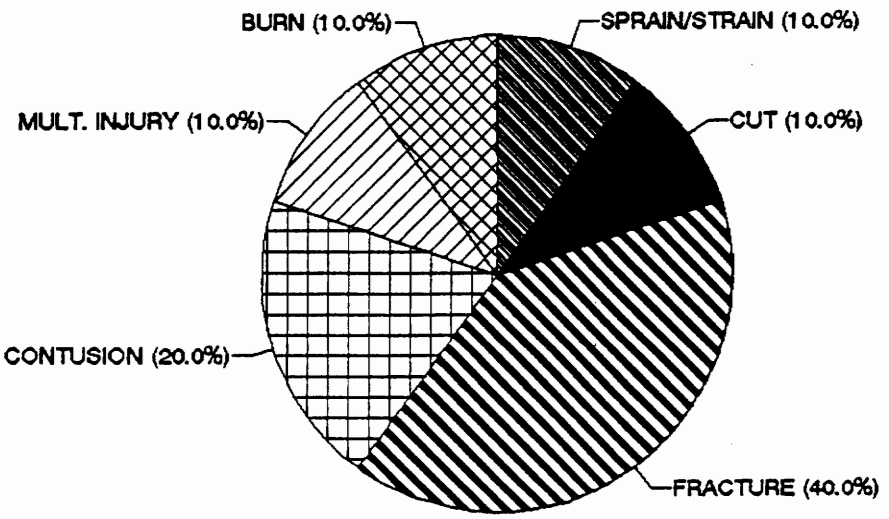



**Figure 4.20. Percentage of Accidents by Nature of Injury**

The high number of fractures reported may be result of the type of medical care required. All fractures require some form of professional medical care where as contusions, cuts,

and sprain/strains may or may not require professional care. All the contractors had first-aid kits on the job and were able to handle most minor injuries. Therefore, fractures were probably reported to the insurance company in each case, while only the more serious contusions, cuts, and sprains/strains which could not be taken care of on the job site were reported. OSHA reports slightly different findings on the "Nature of Injury," indicating the following breakdown; 39.4% sprain/strain, 20.4% cuts, 17.4% fractures, 12.3% contusions, and 5.6% multiple injuries (APA 1991).

The two burns (10% of the accidents) occurred during unusual circumstances related to equipment maintenance. The first occurred while an employee was checking the fuel level in a diesel tank with a lighter. The employee had used this procedure many times before without injury, but for unknown reasons a small explosion burned part of his face and neck. The second accident occurred while jump starting a piece of equipment. The victim was standing near the equipment when the battery exploded burning his face and eyes.

**Job Category**

Figure 4.21 represents the type of job being performed when

the accident occurred. The number of felling accidents (i.e. 10%) was significantly lower than the Department of Labor and Bureau of Labor Statistics (1984) data which showed 23 percent of all accidents occurred while felling trees in eastern states. The low number of felling accidents in this study was again the result of mechanized felling being used by 24 of the 26 contractors. Laflamme and Cloutier (1988) report similar findings indicating conventional cutting significantly increased the accident incidence rate over mechanized cutting.

Forty-five percent of the accidents occurred while Limbing/Bucking which was slightly higher than the 38 percent reported by the Department of Labor and Bureau of Labor Statistics (1984). Limbing/Bucking took place at the landing on mechanized jobs where saw hands motor-manually delimbed and occasionally bucked tree lengths. Laflamme and Cloutier (1988) report mechanization of delimbing and debranching operations significantly reduced the overall potential risk of accidents.

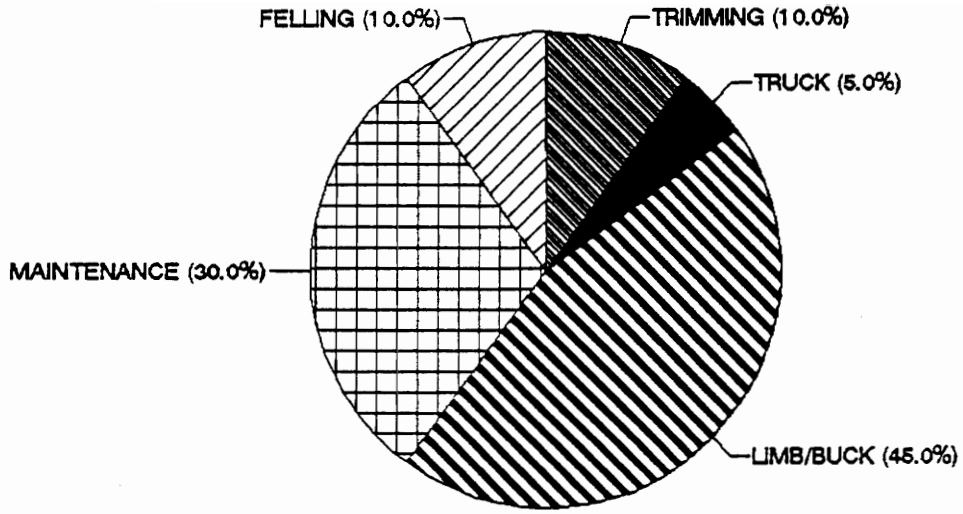



**Figure 4.21. Percentage of Accidents by Job Category**

On tree-length mechanized operations Limbing/Bucking was usually done by the least skilled employees with the shortest tenure as shown in Figure 4.21. On mechanized operations saw hands usually work at or near the landing where the center of action is taking place which requires a thorough knowledge of the skidding and loading operations.

The second highest percentage (30%) of accidents occurred during maintenance work, which requires operator movement on and around the machine. Two of the five maintenance related accidents happened when the operator fell when climbing on the machine. Reducing these types of accidents is difficult and may require the manufacturer to further design increased

footing area on the machine or easier access to engine and machine parts. Education and training to prevent these types of accidents would seem to have little effect.

## FINANCIAL SAVINGS AND OTHER BENEFITS

All of the contractors carried workers' compensation insurance along with various forms of other insurance. The contractors in this study obtained workers' compensation insurance in the following ways: thirteen carried a single insurance policy for their company; five were in "vendor-to" programs through a mill; three were members of a private coalition that obtained their own group insurance policy; and five were in self-insurance funds through state forestry associations. The high number of individual insurance policies was the result of recent elimination of "vendor-to" arrangements in some states. The three contractors with group insurance were members of a coalition organized to obtain less expensive insurance because their operations are completely mechanized and had proven lower accident frequencies. Many of the contractors interviewed felt the "vendor-to" programs were costing them money since they had to pay for other logger's accidents. One contractor, no longer in a "vendor-to" program, reported that he paid out over $60,000 in workers' compensation premiums in the past

five years, but only incurred $1300 in claims during the same time period.

Experience modification factors and premium rates were reported by the contractors during the interviews and insurance companies were contacted to confirm the accuracy of the data. The average experience modification factor was 0.78, for the 19 contractors which could be confirmed with insurance data. Experience modification factors accurately reflected the frequency of accidents, with the contractors who reported the most accidents generally having higher modification factors. Nine of the contractors had experience modification factors were between 0.60 and 0.70, close to the minimum factor of 0.60. As expected, this group of "safety successful" contractors were able to receive substantial premium discounts. Premium rates were reported in various forms including; per $100 of payroll, per cord, per ton, and per thousand board feet. To determine the amount of insurance savings for the participating contractors, the reported rates were compared to the 1990-91 state manual rates (Presented in Table 4.3) compiled by the American Pulpwood Association (Culhane 1991).

**Table 4.3. State Manual Rates for Workers Compensation Insurance ($ per $100 of payroll).**

| STATE | RATE ($) | UPSET FACTOR |
|---|---|---|
| ALABAMA | 54.19* | |
| FLORIDA | 33.80 | |
| GEORGIA | 50.43* | |
| | 4.10/CD* | |
| LOUISIANA | 69.98* | 4 |
| MISSISSIPPI | 35.97 | |
| PENNSYLVANIA | 37.84 | |
| NORTH CAROLINA | 20.26 | |
| SOUTH CAROLINA | 1.90/CD* | 4 |
| TENNESSEE | 1.63/CD | 4 |
| VIRGINIA | 24.61 | |

* Assigned Risk Rates CD - Cords

Conversions for contractors who reported their premiums on a per cord basis were done with the upset formula using the designated upset factor for that state (Wilson 1990).

The cost savings realized by operating safely were put on a percentage basis revealing an overall average savings of 26% below the state rate for workers' compensation insurance. The amount of savings ranged from 0% to a savings of 67%. Four of the ten states, reporting the highest manual rates were for the Assigned Risk category. The contractors operating in these states saved 35% to 67%. For the six states reporting the regular manual rates the contractors savings ranged from 0 to 42%. An example of typical monthly savings would be similar to the actual discount rate

shown below:

| | |
|---|---|
| Monthly Payroll | $32,526.95 |
| Total Maximum Premium | $ 4,203.84 |
| Experience Modification | .70 |
| Modified Premium | $ 2,942.69 |
| | |
| Savings Per Month | $ 1,261.15 |
| Savings Per Year | $15,133.80 |

The insurance premium discounts per year (i.e. $15,133.80) only represents the savings from lowered direct costs. The additional savings from consistent production, lower equipment maintenance, employee moral etc. are not included in this figure but would increase the overall savings from operating safely. The contractors stated that these savings out weighed the cost of operating safely.

Cost of operating safely are hard to document through financial data. The cost of buying personal protective equipment or a new machine to eliminate a hazardous job can be directly related to the amount of savings derived from those investments. However, the cost of higher employee salaries, and better benefits, to improve employee tenure and morale are harder to document.

Most of the contractors knew the benefits or savings they realized far exceeded the costs of the investment in safety.

The contractors often invested their insurance savings into newer equipment, safety equipment, higher pay for the crew, equipment maintenance, more benefits, etc. in order to retain employees and keep production high and consistent, which, in turn, helped to keep injury rates low.

## CONTRACTOR OPINIONS

A follow-up phone interview of contractors was conducted to gather additional information and get their opinions about their logging business and safety program. Many of the follow-up questions were open-ended and designed to obtain their opinions about what worked for them or what factors contributed to operating safely. Occasionally more than one answer was recorded for a question intended to have a single response.

When asked "What are the most important factors contributing to your success in logging?" the replies were fairly consistent (See Table 4.4).

**Table 4.4. Important Factors Contributing to Success in the Logging Business**

| NUMBER | REPLY |
|---|---|
| 13 | PRODUCTION |
| 13 | CREW |
| 8 | EQUIPMENT |
| 7 | TIMBER SUPPLY |
| 1 | MAINTENANCE |
| 1 | SAFETY |

"Production" and "Crew" were the most frequent replies. When the contractors replied "Production," about half stated that a consistent production level was necessary while the other half stated high production was needed for success. Consistent production often meant a steady quota that allowed the contractor to operate a full week instead of a partial week. When referring to "Crew," contractors typically meant their crew was stable, experienced, or hard working. One of the contractors who believed his crew was "key" to his success stated that "Even with the best equipment and wood order, your nothing unless you have good people working for you. I think a good experienced crew has been what's made me successful in the logging business." Only one contractor replied "Safety" was needed for success in the logging business. The majority of the contractors felt that safety was not a separate key component, but an essential part of managing their operation and retaining a "good crew."

The contractors were asked "How long did it take you to get a stable crew?" (See Table 4.5).

**Table 4.5. Number of Years to Achieve a Stable Crew**

| NUMBER | REPLY (YEARS) |
|---|---|
| 14 | 0 - 3 |
| 5 | 3 - 6 |
| 2 | > 6 |

The majority of the contractors were able to form a stable crew in less than three years, and two of the contractors formed a stable crew from the first day due to family members who all stayed with the crew. Many of the contractors stated they have a core group or "key employees" with low turnover, and a few other employees who always "come-and-go." The people who tended to come-and-go, were typically saw hands and truck drivers. The data supports this theory, indicating the shortest tenure was for saw hands and truck drivers (See Figure 4.10). A few of the contractors stated they add saw hands and truck drivers on a temporary basis when higher production levels were needed.

The contractors were also asked "How do you hold onto or retain your employees?" Here again, the replies were fairly consistent (See Table 4.6).

**Table 4.6. How Contractors Hold Onto Their Employees**

| NUMBER | REPLY |
|---|---|
| 10 | KEEP CREW HAPPY |
| 8 | STEADY WORK |
| 8 | GOOD PAY |
| 3 | GOOD EQUIPMENT |
| 2 | FAMILY |

Keeping the crew "happy" was the most common reply. This was typically done by paying fair wages and providing benefits and various special "perks" such as money advances, loans, use of shop etc. Steady work and good pay were also important and mentioned frequently. Steady work and good equipment were particularly important to crews paid on a production basis. One contractor stated "My men like to work with equipment, not on it."

When asked "How does employee turnover effect your business?" two main replies were mentioned: lower production and safety (i.e. more accidents) (See Table 4.7).

**Table 4.7. How Employee Turnover Affects the Logging Business**

| NUMBER | REPLY |
|---|---|
| 17 | LOWER PRODUCTION |
| 14 | SAFETY (i.e. accidents) |
| 6 | CREW |
| 5 | EQUIPMENT |

Most of the contractors felt new employees reduced the crew's production and increased the chance of an accident occurring until they learned how to function with the rest of the crew A new man often disrupted the work flow until the crew accepted him. One contractor stated that "Turnover will kill you literally and financially in logging." The time frame for acceptance was dependant on whether or not they had previous knowledge of the new member and his personality.

The question "Why do you have a low accident rate," revealed four main reasons (See Table 4.8).

**Table 4.8. Reasons for Low Accident Rates**

| NUMBER | REPLY |
|---|---|
| 10 | EXPERIENCED CREW |
| 8 | MECHANIZATION |
| 6 | TRAINING/SAFETY EDUCATION |
| 4 | PERSONAL PROTECTIVE EQUIP. |

The quality of the crew and the level of mechanization of the operation were two of the main reasons for a low number of accidents. Contractors believed that an experienced crew was the key to lower accident rates, and more mechanization, particularly in felling and limbing, reduced the exposure to

accidents. Although mechanization was touted as the key to lower accidents this study did not contain sufficient data for comparison between mechanized and unmechanized logging operations.

Personal protective equipment was mentioned by only four contractors as a major factor in making their operations safer. Two of the four contractors were hardwood loggers that used chain saws heavily and were required to wear personal protective equipment as part of their insurance agreement. Both contractors believed in the effectiveness of personal protective equipment and consistently wore chaps, hard hats, steel-toed boots, face screens, and ear protection.

The low number of contractors mentioning personal protective equipment was probably the result of the mechanization level of most of these jobs. Mechanized operations typically had a lower exposure to chain saws with which the use of personal protective equipment has typically been associated. Most contractors did not require their operators to wear hard hats, and ear and eye protection while working in an enclosed cab. Saw hands were usually the only crew members wearing hard hats and chaps the majority of the day, and most did not wear the ear and eye protection provided unless

the contractor insisted.

When asked "What are the benefits of a having good safety record?" a consensus was revealed (See Table 4.9).

**Table 4.9. The Benefits of a Good Safety Record**

| NUMBER | REPLY |
|---|---|
| 17 | LOWER INSURANCE COST |
| 11 | CREW AND OWNER MORALE |
| 8 | CREW STABILITY |
| 4 | INCREASED PRODUCTION |

Almost all the contractors felt that lower insurance cost was the main benefit. With workers' compensation steadily increasing, they felt anything that could be done to help reduce their costs was worth the effort. Most of the contractors participating in this study were receiving large discounts because of their safe work record. The second most frequent reply was "crew and owner morale." Many contractors felt crew morale was key to increased production and safety on their job. A crew in good spirits worked harder and was more alert to potential hazards.

The last question "How does mechanization effect safety on your job?" indicated an almost unanimous reply.

**Table 4.10. The Effect of Mechanization on the Safety of Logging Jobs**

| NUMBER | REPLY |
|---|---|
| 19 | MECH. INCREASES SAFETY |
| 1 | UNSURE OF MECH. AND SAFETY |
| 1 | NOT DESIGNED FOR MY TERRAIN |

Almost all of the contractors felt mechanization improved the safety of their operation. These contractors typically stated that the "fewer men you have operating chain saws the safer your job." Chain saws were typically used for limbing trees at the landing and only two contractors used motor-manual felling (i.e. two hardwood loggers). The contractor who replied "mechanization is not designed for my terrain," was a hardwood logger operating in a mountainous area. Here again, this study did not have sufficient data to compare accident frequencies between mechanized and unmechanized operations.

## EFFECTIVE MANAGEMENT TECHNIQUES

During the visits to the job, several interesting, but unquantifiable observations were noted. Each contractor had his own unique management style and different methods for keeping his operation working safely. A few of the more interesting examples are discussed in the following

paragraphs.

A close kinship or "togetherness" could be observed on all the operations visited regardless of crew size or the number of family members. A mutual respect of the contractor for his employees and of the employees for the contractor was also found among the participants. One contractor summed up the typical attitude when he stated that "I don't call the men who work here my employees, they're my people and they don't work for me, but with me." This type of attitude was indicative of the type of contractors who were visited and seems to lead to the higher crew tenure and improved safety. Another contractor stated "I treat them (crew) fair and I'm easy to work for, that's why they stay with me." Picnics, cookouts and other special activities with the crew were another method of fostering crew "closeness." The contractors' attitudes were hard to document, but almost all could be described as "people-oriented".

Flexibility and extra consideration were also part of the contractors management style. One contractor gave saw hands longer and more frequent breaks on hot days to improve their stamina. He stated that "With all the safety gear on, the saw hands needed more breaks than the other guys, because they tend to wear out in the afternoon." The contractor

also mentioned he employed more saw hands in the summer to reduce the work load per man. Another contractor allowed his feller-buncher operator to use flex time in order to return home to watch his children while his wife worked in the afternoon. The feller-buncher operator came in and left two hours earlier than the rest of the crew in order to work a full day. If production was still needed from the feller-buncher the owner would operate the machine in the afternoon. This type of personalized employee concern was the norm rather than the exception for many of the contractors visited.

One of the larger contractors, with a waiting list of people who wanted to work for him, developed an upscaled screening program. The contractor required all potential employees to fill out a written application which requested information on such things as previous employers, reasons for leaving their last job, medical history, criminal background, traffic violations, etc. All potential employees were first screened by an employment agency and then checked out by the owner who called their previous employers. If the owner decided to hire the employee, he was also required to take a drug test and subject himself to future random drug tests. The contractor mentioned the extra cost of using the employment agency and drug testing were small compared to

potential workers' compensation claims or equipment damage resulting from hiring reckless employees.

One contractor had safety and production meetings every Monday morning to discuss the current tract and its potential hazards with the crew. They discussed where the feller-buncher should cut first and what the expected production goals were for the current tract. The contractor felt this helped the crew become more aware of potential hazards and made them feel that they were a part of the total operation. The contractor stated "If a man feels he's contributing he's always a better worker in terms of production and safety, I think." Another contractor required all the employees to read and sign a written safety agreement which required such things as hard hats, ear and eye protection, saw chaps, no alcoholic beverages, submitting to drug testing, etc. The contractor felt if the employees all had a copy of the written rules it would be easier for them to follow.

Total and absolute compliance to wearing the available personal protective equipment, was emphasized by only a few contractors notably the non-mechanized crews. Two loggers with the NORTIM program had been through the safety and production training, and felt personal protective equipment

was extremely important and effective for their operation. One contractor stated "Before the NORTIM training, I'd go to the tree without any safety equipment, make my face cut, then my back cut, and let it fly. With the training and personal protective equipment I can place the tree anywhere and feel confident being next to it." Both contractors had not worn personal protective equipment prior to the safety training, but now promote its use for other loggers. Another contractor felt his employees would be with him a long time and was afraid of the long term effects of noise. He therefore required all his men to wear ear protection on the job stating that "I want my men to be able to hear when they're fifty years old." The attitude toward personal protective equipment varied, but most contractors were firm believers in its use and effectiveness.

# CHAPTER 5

## SUMMARY AND CONCLUSIONS

A select group of twenty-six "safety successful" logging contractors in ten southeastern states were interviewed to determine why they experienced fewer and less severe accidents than others in their regions. Contractors were selected on the basis low experience modification factors, recommendation of local mills, and their reputation in the working area. Demographic data indicated that the majority of these contractors were similar to other operations in their region in terms of age, education, harvesting method, crew size, method of payment, and harvesting system.

The following conclusions were based on data obtained during interviews with each contractor and personal observations noted during the visits to their operations.

**The contractors interviewed were better than "average" in terms of their safety record, but by no means accident free.**

The contractors were identified as safer operators through experience modification factors which averaged 0.78. The 26 contractors had very low accident frequencies, but still

incurred 91 reported accidents during the past 3-5 years. The majority of the accidents were minor (i.e. < $500) and three of the contractors incurred 56 (61%) claims due mostly to their careful reporting practices. Many of the 20 well-documented accidents were falls, a result of the work environment. Training and education would have little significant impact on this type of accident, and significant gains can only come from altering the work or the workers' environment. Even though the contractors had 91 reported accidents (an average of 9.6 accidents per 100 employees per year), they had no fatalities and still had roughly half as many reported accidents as loggers nationally (an average of 20.67 accidents per 100 employees per year).

**The contractors were similar to others in their region in terms of harvesting equipment and crew size, but were able to produce at higher rates while maintaining lower accident frequencies.**

The contractors in this study represented a wide range of productive capacity, but all were successful in terms of maintaining high rates of productivity. As a group, they averaged 64.3 cords per-man week compared to 40.6 cords per-man week published in other surveys of logging contractors. Regardless of operation size, efficient utilization of

logging capacity and operating with favorable wood quotas may be the explanation for the higher production rates. Most of these contractors were able to produce at or near their harvesting system's potential throughout the year (i.e. at an estimated 70-90% of system capacity). Perhaps, the additional capital generated enabled them to invest capital in new equipment and better maintenance procedures, pay slightly higher wages, provide more benefits, etc. to improve the operation of their business. The ability to utilize their existing capacity and improve the efficiency of the job, in turn, seems to have contributed to the overall safety of the operation. Laestadius (1990) and Loving (1991) suggest that safety and environmental degradation are associated with excess logging capacity. Marginal producers have a more difficult time buying good equipment and holding onto experienced employees than contractors who are able to maintain higher production levels, generate adequate incomes, and reinvest more capital in the business.

**Crew stability, tenure, and experience probably had the greatest effect on reducing the frequency and seriousness of accidents.**

For the most part, the contractors were able to hire and

retain experienced workers. Crew tenure averaged 7.4 years for the 190 workers and varied with job classification. Feller-buncher and loader operators tended to have higher crew tenure, while skidder operators, saw hands, and truck drivers had lower crew tenures, respectively. The contractors were able to hold onto employees through a combination of methods: management skills that fostered crew unity, better wages, more benefits, and special considerations. Loving (1991) associates higher turnover with accident frequency as well as other problems in the logging industry. This study was unable to find other logging crew tenure data for comparison, so only speculative conclusions can be made. The contractors in this study all had well established crews and had no problem retaining employees or finding new ones which suggests that these contractors probably had significantly higher crew tenure than other loggers operating in their respective areas.

**Although important, a formal safety program was absent and was not a separate or distinct component of the contractor's management practices.**

Only a few of the contractors interviewed had formal safety training or job training programs. Safety and low accident frequencies were more the result of the character and

experience of the people employed, and their length of time with the contractor. The contractors repeatedly stated that a good crew was key to success (along with mechanization), but seldom brought up a safety/training program as the reason for their low injury rates. Most of the crews experienced low rates of turnover with the majority of the workers having been together many years (i.e. 7.4 years). This type of atmosphere breeds loyalty among the crew and with the owner and eventually leads to a safer operation because the crew members "watch out" for each other and know each other's operating habits. While safety and job training may be effective in preventing logging accidents, formal programs were rare among the contractors interviewed. Even though formal safety training had limited use on these operations, interest in safety education for the logging industry was high among the contractors and often mentioned along with other management and supervisory concerns.

**Use of personal protective equipment was the norm rather than the exception on these contractors' operations.**

Use of personal protective equipment was mandatory for all operations and compliance was very high, especially for hard hats and saw chaps, where applicable. Ear and eye protection were provided on all the jobs, but only a few contractors

made their use mandatory. The use of personal protective equipment was influenced by the contractor's personal opinions and workers' compensation insurance requirements. The majority of contractors in this study believed in its effectiveness and used personal protective equipment because of personal commitment rather than fear of their insurance company or OSHA regulations. Although use of personal protective equipment was high, a few contractors were skeptical of its effectiveness and believed it to be potentially hazardous in some cases.

**Contractors believed mechanization of the harvesting systems helped to reduce accident frequencies.**

The contractors in this study felt mechanization of their operation, particularly mechanized felling and delimbing, reduced the frequency of accidents. The participating contractors had roughly half (9.6 accidents per year) as many accidents per 100 workers as loggers nationally (20.67 accidents per year). In more mechanized operations, less men are working on the ground and fewer men are operating chain saws. Reduced accident frequency due to mechanization was also reported in previous publications dealing with logging safety. Again, this study did not have sufficient data for an accurate comparison of accident frequencies between

participating mechanized and unmechanized contractors.

**Because their operations were mechanized the type, location, and severity of the accidents which occurred for the group of contractors studied was different from the larger population of loggers.**

The majority of the accidents (75%) happened at or around the landing during limbing/bucking and maintenance activities. Because most jobs utilized mechanized felling the location of accidents changed from traditional in-woods sites to the landing. The accidents which did occur tended to be less severe and harder to prevent through training due to the uncontrollable environment and conditions. The majority of the accidents recorded were classified as minor (i.e less than $1000) and incurred little, if any, lost time and/or production delays.

**Production levels and crew size did not affect the safety of the operation for the contractors in this study.**

The amount of production and crew size had no affect on accident frequency. In fact, one of the smallest crews (4 men), with a production rate of 486 tons/week, had one of the highest accident frequencies per 1000 man hours (.10),

and one of the largest crews (13 men), with a production rate of 1800 tons/week, had one of the lowest accident frequencies per 1000 man hours (.05). Higher rates of production, however, allowed the contractors to generate income which could be reinvested into the business. Thus, the ability to fully utilize logging capacity allowed the contractors in this study to improve the overall operation of their business which contributed to an improved safety record.

**The benefits far outweighed the cost of maintaining a safe operation.**

The main benefits of operating safely, other than fewer accidents, was reduced workers compensation insurance premiums and stable production rates throughout the year. In addition to lower rates, averaging 26% below the state manual rates, many contractors felt working safely kept production levels steady, improved crew morale, and enhanced the reputation of their business in the local community. The cost savings of the premium discounts were substantial, and the typical savings could be expected to be in the thousands of dollars per year depending on payroll and the contractor's premium reductions. The savings realized by avoiding direct medical expenses, higher worker's

compensation rates, lower production levels, time to hire replacements, and time to train new workers, were repeatedly mentioned as greatly exceeding any costs associated with operating safely.

**All the contractors recognized the value of operating safely, but they felt that safety was just part of the normal operation of a well-managed logging business.**

Good business management was the key component to the success of the operation in terms of finance and safety. On average, the contractors interviewed in this study were financially successful and had been in business longer than other logging contractors operating in the southeast. The long business life implies effective and efficient business management which enabled them to survive over the years. The contractors did not place any more emphasis on safety than they did on production, hiring/retaining good employees, or equipment maintenance. Effective management, especially people-management skills, improved their financial security which, in turn, influenced other parts of the business including safety. Financially stable contractors are also able to provide more to their employees in order to retain them, and to reinvest in new equipment which keeps production at higher and more consistent levels.

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**APPENDIX A:**

**"Successful Contractors" Questionnaire**

**I. Introduction**

A. Objective of the study
   1. Methods we will use

   2. Summary of the results

   3. Value to contractor and industry

**II. Harvesting System Information**

A. Type of System

| | | | |
|---|---|---|---|
| 1._____ | Hardwood Thinning | _____ | Pulp |
| | | _____ | Sawlogs and veneer |
| | Clearcut | | |
| | | _____ | Mix: |
| 2._____ | Pine Thinning | _____ | Pulp |
| | | _____ | Sawlogs and Veneer |
| | Clearcut | | |
| | | _____ | Mix: |
| 3._____ | Pine & Hardwood Thinning Clearcut | _____ | Pulp |
| | | _____ | Sawlogs and veneer |
| | | _____ | Mix |

B. Product Form ( Shortwood , Longwood , Tree Length, WT Chips)

C. Level of Mechanization

1._____ Fully (No men on the ground
2._____ Partially (No men on the ground, except at landing)
3._____ None (Men on the ground -landing and in the woods)

D. Is harvesting your only business?
Yes_____
No _____ Other?

E. Equipment Spread

1. In-Woods Productive Equipment

2. Truck & Trailer Equipment

3. Communications Equipment?

**III. Crew Information**

A. Crew Type

1._____ Established working crew
2._____ Recently formed crew
3._____ New crew and operation
4._____ Other:

B. Number of Cews_____

C. Number Of Employees_____ Number Of Crews_____

D. Production History

1. Average weekly production (Tons,Cords or Loads)

2. Is production controlled by mill quotas?^T

E. Usual Work Week

1. Work Week _____ Hours
2. Work Day Begins _____ Ends_____
3. Amount of time for lunch and breaks _____ Hours

F. Method of Payment

1._____ Hourly
2._____ Weekly (Guaranteed Number Of Hours)
3._____ Production
4._____ Wage w/ production bonus
5._____ Other:

G. Do you offer your employees any type of benefits?

1._____ Paid Holidays or Vacation
2._____ Uniforms
3._____ Health Insurance
4._____ Other?

H. Crew Selection
1._____ Previous knowledge of individual.
2._____ Potential crew members are interviewed.
3._____ References are required.
4._____ Applications are required.
5._____ Physical are required.
6._____ Worker's comp. record checked.
7._____ Drug test for truck drivers.

8. Who is last man you hired and how did you find him?

9. General discussion on selection of crew.

I. Operator Training Methods

1. Do you have some sort of training for employees? Yes_____

No_____
a._____ Employees are trained by owner
b._____ Employees are trained by a foreman or other workers
c._____ Only hire experienced workers
d._____ Other:

2. General Discussion on Training

3. Do crew members receive any formal safety training?
_____ Yes
_____ No

4. Who is responsible for safety training?

5. What was included in the safety training received?

**IV. Contractor's Management Style (Supervision)**

A. Contractor's Background

1. Age

2. Highest Level Of Education

3. Years of Logging Experience

B. Supervision

1._____ In woods, part-time supervisor
2._____ In woods, full-time supervisor
3._____ In woods, working supervisor
4._____ Owner does not supervise daily operation.
5._____ Other:

C. Amount of Supervision

1._____ Workers are closely supervised
2._____ Workers are loosely supervised
3._____ Workers supervise themselves or don't need supervision
4._____ Other:

D. Do you have a foreman?

E. What kind of supervisor are you?

F. How do you view your labor, how well do you get along?

G. What type of attitude do your workers have?

**V. Worker's Compensation Insurance**

A. Who carries your worker's compensation?
Name_____

1._____ Vendor policy with wood buyer
2._____ Owner carries insurance by himself
3._____ Owner has insurance through group plan
4._____ Owner is grouped into assigned risk pool
5._____ Other:

6. How long have you had your current 4 WC carrier?

7. What is your experience modification factor for your worker's compensation? Do you receive other discounts?

8. Does a WC inspector visit your job site?

9. Is your WC inspector helpful?

B. Do you pay small accident claims yourself or turn them into WC?

D. What other types of insurance do you carry?

E. Within the past 5 years how many accidents have you had?

Accident: Lost Time:
Circumstances:
Approximate Cost:
Effect on Insurance:

## VI. Safety Equipment and Personal Safety

A. First Aid and Emergency Medical Care

1.____ First aid kit available for minor accidents

2.____ First aid kit available for major accidents

3.____ No first aid kit

4.____ Other:

B. Protective Equipment Used On The Job

Hard Hat
Ear Protection
Eye Protection
Leg Protection(Chaps)
Steel Toe Boots
Gloves
Visible Clothing
Other:

## VIII. Monetary Benefits Of Safety

A. The Effect Of Safety

1._____ Safety has lowered my insurance.

2._____ The effects of safety might have lowered my insurance rate.
3._____ The effects of safety have not lowered my insurance rate.
4._____ Other:

5. How much has safety lowered your insurance rates?

B. Production

1._____ Safety has lowered my production.
2._____ Safety has increased my production.
3._____ Safety has had no effect on production.
4._____ Other:

C. Crew

1._____ Safety has lowered crew turnover.
2._____ Safety has increased crew turnover.
3._____ Safety has not affected the crew turnover.
4._____ Other:

D. Equipment

1. Has safety affected equip. selection,cost or maintenance.

2. Has safety affected life of the equipment?

3. Other

## IX. Non-Monetary Benefits From Safe Operation

A. Has safety improved crew morale?

B. Has safety affected your reputation among other contractors?

C. Has safety affected your reputation with the people you supply wood?

D. Has safety affected your reputation with local community.

**X. Summary Question**

A. What suggestions or recommendations would you give other loggers?

**XI. Company Safety Program**

A. Program
1._____ Company has formal safety program
2._____ Company has informal safety program
3._____ Other:

B. Start of Program

1._____ Owner started program
2._____ Crew members started program
3._____ Outside person started program (i.e. Safety Program)
4._____ Other:

5. How long have you had your program?

6. What was the main reason for establishing a safety program?

C. Program Philosophy

1. Does your safety program have meetings?

2. Who conducts the meetings?

3. How often do they occur?

4. When do they occur? Day _____
Time_____

5. How long do they last?

6. Are meetings mandatory or optional?

7. What topics are discussed at the meetings?

8. Do you use safety literature or videos during your meetings?

9. Do your employees receive any formal safety training?
10. What type of training would you like to have access to?

D. Do you monetarily reward safe workers? _____ Yes
_____ No

1. How are employees compensated for safety?

2. How often are employees compensated?

E. Do you provide other types of incentives to employees to work safely? _____ Yes
_____ No

1._____ Employees given time off with pay

2._____ Employees recognized for safe work record

3._____ Employees given gifts for safe work record

4._____ Other:

G. Enforcement of Safety

1._____ Men are required to operate using safe procedures
2._____ Men are expected to voluntarily use safe procedures
3._____ Men are not required to use safe procedures
4._____ Other:

## XII. Components Of A Successful Safety Program

A. Why has your safety program been successful?

B. What else might you do to improve your operation?

## APPENDIX B:

## CONTRACTOR SUMMARY SHEETS

### Summary: 101

**Contractor**
Age: 34
Logging Experience: 8 years (Started business in 1983)
Education: B.S. Accounting
Region: Coastal Plain

**Type Of Harvesting System**
Partially mechanized (1 Deck hand)
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut
Production: Crew 1: 900 Tons pine/wk
Crew 2: 800 Tons HW/wk
Quota: No

Equipment Crew 1: 2 Grapple Skidders
1 3-Wheeled Chainsaw Feller-Buncher
1 Loader with CTR Delimber
3 Contract trucks

Crew 2: (Not observed)

**Crew Data**
Number of Employees: 12
Crew 1 - Established Crew: 1-2 years, 6 men, Pine
Crew 2 - Established Crew: 6-7 years, 6 men, HW & Pine
Work Week: 5 Days/wk, 8 hrs/day, or until quota is filled
Method of Payment: Production ($/cord), Bonus paid for over 40 Loads/wk

**Crew Benefits**
Crew receives 1 wk paid vacation
Paid Holidays
Uniforms Provided

**Crew Selection**
Crew recommendations
Interviews
Applications
WC record checked with local contractors
Looks for experienced woods labor

**Management Style**
Owner is part-time supervisor; works mostly in woods
Foreman: Loader operator acts as foreman when owner is away
Men supervise themselves; "Men know what to do, and do it"
Men get the same amount of work done if owner is not on job
Crew has occasional cookouts on the job for lunch

**Employee Training**
Job - No formal program; has trained men himself
Safety - No formal program; occasional safety talks

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Eye Protection - Voluntary
Ear Protection - Voluntary
Chaps - Voluntary

**Workers Compensation**
Experience Modification Factor: .70
Rate:
Pays small claims <$500 that will not lead to potential law suit

**Accident History Past 5 Years**
Accident 1: Man burned while checking fuel with lighter (WC claim)
Accident 2: Cut foot with saw (Paid by owner)

**Quotes**
"I take care of them (crew) and they take care of the job."

**Keys to success**
1) "Got to have good employees no matter how well you can manage, they must be dependable and take care of your equipment."

**Miscellaneous**
Owner worked as an accountant before logging
Father owns a trucking company
Operates a shop for maintenance
Owner has a cellular phone
Chaps are not required by NCFA so owner does not make them mandatory for his crew

## Summary: 102

**Contractor**
Age: 31
Logging Experience: 10 years (Business in 1981)
Education: B.S. Accounting
Region: Coastal Plain

**Type Of Harvesting System**
Fully mechanized
Product: Tree Length Pine Pulp & Chip-n-Saw
Method: Clearcut
Production (TL): Crew 1: 80 Loads/wk
Crew 2: 50-60 Loads/wk

Production (Tons): Crew 1: 2000 tons/wk
Crew 2: 1100-1320 tons/wk

Quota: Yes, 3600-3700tons/wk

Equipment Crew 1: 1 Feller-Buncher (Shear)
1 Feller-Buncher (Shear)
2 Grapple Skidders
1 Loader
4 Trucks and 5 Trailers

Equipment Crew 2: 1 Feller-Buncher (Shear)
2 Grapple Skidders
1 Loader
4 Trucks and 4 Trailers

**Crew Data**
Number of Employees: 10 in woods
Crew 1 - Established Crew: 1 man with<1 yr, 6 men with 3-25 years
Crew 2 - Established Crew: 1 man with<1 yr, 4 men with 3-5 years
Work Week: 5 days/wk, 50 hours, Overtime over 40 hours
Method of Payment: Hourly with bonus for loads/week

**Crew Benefits**
Crew gets 1 week paid vacation
5-6 paid Holidays
Money advances
Uniforms

**Crew Selection**
Crew recommends people, "Truckers are hard to keep"

Turnover is high for truckers due to competing freight contractors
WC program requires written form for accident history
Tries to hire experienced men

**Management Style**

Owner is part-time supervisor; office work but tries to visit job daily
Foreman: Each crew has mechanic (as fill in man) and foreman who is responsible for all woods operations
Men supervise themselves

**Employee Training**

Job - No formal program
Safety - No formal program; Foreman has first-aid training

**Personal Protective Equipment**

Contractor Provided Equipment
Hard Hat - Mandatory, all men on job
Eye Protection - Mandatory, all men on the job (Glasses)
Chaps - Mandatory, if running a chainsaw

**Workers Compensation**

Experience Modification Factor: .75
Rate: $26/$100 of pay roll
Has not had to pay any small claim

**Accident History Past 5 Years**

Accident 1: Topping off loaded truck and top hit foot (WC claim)
Accident 2: Truck turned over on road (WC claim)

**Quotes**

"If you get into a safe routine, it will not take any longer to do the job"
"Must hire experienced men, can not afford the production loss while training [new employees]."

**Keys to success**

1) Need a good company/supply outlet
2) Need good equipment and maintenance program
3) General knowledge of forestry

**Miscellaneous**

Did not visit woods operation *
Does not have a wood quota. Very production oriented
Father operates WTC operation in same area

Trucks are equipped with on board scales
Operates maintenance shop with 3 full-time mechanics
Drug testing is available, but has not used it

**Summary: 103**

**Contractor**
Age: 62 and son is 25
Logging Experience: 40+ and 5 years
Education: Owner - Completed High School
Owner - B.S. Industrial Management
Region: Piedmont

**Type Of Harvesting System**
Partially Mechanized (2 sawyers on deck)
Product: Tree Length Pine & HW Pulp & Sawlogs
Method: Clearcut
Production (Loads): Crew 1: 80-85 loads/wk
Crew 2: Not observed

Production (Tons): 1760-1800 tons/wk

Quota:: Yes, 1800 tons/wk

Equipment: 3 Grapple Skidder
2 Feller-Buncher (1 Shear, 1 Sawhead)
1 Loader
1 Crew Van
1 Maintenance Truck
7 Trucks and 7 Trailers

**Crew Data**
Number of Employees: 19
Established Crew: 6-35 years
Work Week: 40 hrs/wk, 8-9 hrs/day, Overtime for 40+ hours
Method of Pay: Hourly and bonus on loads, Foreman salary

**Crew Benefits**
Major Holidays with extra pay
Christmas bonus ($500)
Christmas dinner
Safety bonus for accident free year ($100)
Years of service recognition
Transportation
Heatlh care employee and family

**Crew Selection**
Hire experienced men for the job needing filled
Must have at least chainsaw experience

**Management Style**
Owner part-time supervisor; works mostly in office
Son is full-time supervisor; works in woods
Foreman: Fill-in man and mechanic
Men loosely supervised;
"Men are top notch, they are paid well and work hard"

**Employee Training**
Job - No formal program; work man slowly into new position
Safety - No formal training; Owner trains men

Son has first aid training
Safety meeting every month with crew
Safety inspection of equipment every other month

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Voluntary (Glasses)
Ear Protection - Voluntary (Plugs)
Steel-Toed Boots - Mandatory, all men on job
Gloves - Voluntary

**Workers Compensation**
Carrier: Pennsylvania Manufacturers Association
Experience Modification Factor: .66
Rate: $20.95/$100 payroll
Premium Discounts for safety
Has not had to pay any small claims

**Accident History Past 5 Years**
Accident: None

**Quotes**
"Men will do what you ask, if you pay them well and treat them right"

**Keys to success**
1) Production
2) Efficiency
3) Safety
4) Labor

**Miscellaneous**
Contractor runs two crews and employees 40 people
Contractor has a business office and shop for repair and maintenance work

## Summary: 104

**Contractor**
Age: 39
Logging Experience: 15 years (Started business 1976)
Education: Completed High School and 1 year of Tech. school
Region: Piedmont

**Type Of Harvesting System**
Fully Mechanized
Product: Tree Length Pine Pulp & Sawlogs
Method: Thinning 90%, Clearcut 10%
Production 350 Tons/wk
Quota: Yes, 12 loads

Equipment: 1 Grapple Skidder
1 3-Wheeled Feller-Buncher, Sawhead
1 Loader with saw buck
1 Gate Delimber
1 Set out Truck
2 Contract Truckers

**Crew Data**
Number of Employees: 3
Established Crew: 3-10 yrs
Work Week: 4 days, 10 hrs/day, Overtime for 40+ hours
Method of Pay: Hourly 40 hrs/wk (Not Guaranteed)

**Crew Benefits**
Two week paid vacation
Retirement Plan
Major Holidays with pay

**Crew Selection**
Crew recommendations, "Try them out and see how they work"
Strictly hire experienced men

**Management Style**
Owner is a full-time supervisor; works mostly in woods
Foreman: Owner
Men supervise themselves; "I'm easy to get along with"

**Employee Training**
Job - No formal program
Safety - No formal program; safety talks occasionally
Owner and one employee have First-Aid training

**Personal Protective Equipment**
Contractor Provided Equipment:

Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Voluntary (Glasses)
Ear Protection - Voluntary (Plugs)

**Workers Compensation**

Experience Modification Factor: ? (First year with carrier)
Rate: $24.60/$100 payroll

**Accident History Past 5 Years**
Accident: None

**Quotes**
"Maintenance is everything"

**Key to success**
1) Work for a year and see if you like it
2) Talk to other loggers and see what they do

**Miscellaneous**
Owner and one crew member worked with a company logging crew before it was shut down

**Summary: 105**

**Contractor**
Age: 50
Logging Experience: 28 years
(Year started in business 1962)
Education: Completed High School
Region: Piedmont

**Type Of Harvesting System**
Fully Mechanized
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut and Thinning
Production (Tons): 4500 tons/wk
2200 tons/wk/crew

Equipment: 2 Grapple Skidders
1 Feller-Buncher, Sawhead
2 Loaders in tandem one with CTR delimber
16 Trucks in dispatch system
1 Dozer for road building
1 Motor grader for road maintenance

1 Service/Crew Truck

**Crew Data**
Number of Employees: 6 per crew
Established Crew: 1.5-12 years
Work Week: 5 days, 8 hrs/day
Method of Pay: Hourly

**Crew Benefits**
One week paid vacation
6 Paid Holidays
Health Insurance (50% Coverage)
Uniforms Provided
Transportation

**Crew Selection**
Previous knowledge and in woods experience
Applications required

**Management Style**
Owner is a part-time supervisor; works mostly in office
Foreman: Brother is foreman
Men supervise themselves; "Job mostly runs itself"

**Employee Training**
Job - No formal program
Safety - No formal program, safety talks weekly

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Mandatory, all men on job (Glasses)
Ear Protection - Mandatory, all men on job (Plugs)

**Workers Compensation**

Experience Modification Factor: .88
Rate: $26.00/$100

**Accident History Past 5 Years**
Accident: Log rolled on landing and bruised foot (WC Claim)

**Quotes**

**Keys to success**

**Miscellaneous**
Owner is also involved in real estate and owns a equipment dealership
Trucking is scheduled through dispatch system by contractor and another logger in the area (2 full-time dispatchers)
Trucks have super singles and aluminum rims etc.

**Summary: 106**

**Contractor**
Age: 37
Logging Experience: 14 years (Started business in 1977)
Education: College B.S. Geology
Region: Piedmont

**Type Of Harvesting System**
Partially mechanized (1 Sawyer on deck)
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut
Production (Cords): Crew 1: 300 cds/wk
Crew 2: 300 cds/wk

Production (Tons): Crew 1: 810 tons/wk
Crew 2: 810 tons/wk

Quota: Yes, 300 cds Max: 500 cds

Equipment Crew 1: 2 Grapple Skidders
1 Feller-Buncher, Shear
1 Loader
1 Gate Delimber
2 Trucks and 3 Trailers
1 Service/Crew Truck

Equipment Crew 2: 1 Grapple Skidder
1 Feller-Buncher, Shear (Bobcat)
1 Loader
1 Gate Delimber
1 Service/Crew Truck
2 Contract Trucks

Crew 2: Not observed

**Crew Data**
Number of Employees: 9
Crew 1 - Established Crew: 2-7 years, 5 men

Crew 2 - Established Crew: 1-6 years, 4 men
Work Week: 5 days/wk, 8-9 hrs/day
Method of Payment: Production ($/cord)

**Crew Benefits**
Higher pay for key employees
Crew receives 1 wk paid vacation
Days off with pay, Christmas bonus
Health insurance
Transportation

**Crew Selection**
Crew recommends experienced people, and tries to hire family members if they are good workers

**Management Style**
Owner is part-time supervisor; works mostly in woods
Foreman: Crew 1: Owner
Crew 2: Feller-Buncher operator
Men supervise themselves; "I'm learning all the time, I don't tell them what to do, I point it out to them"

**Employee Training**
Job - No formal program; put man in safety gear and watch how he works and his attitude
Safety - No formal program; occasional tailgate session if problem occurs

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Mandatory, all men on job (Shields)
Ear Protection - Mandatory, all men on job (Muffs)
Steel-Toed Boots - Mandatory all men on job

**Workers Compensation**

Experience Modification Factor: .67
Rate: $1.30/cord
Has not had to pay any small claim

**Accident History Past 5 Years**
Accident: Truck driver injured back from lifting ramp alone (WC claim)

**Quotes**
"Ear protection is very important, the good out ways the bad. Over the course of a lifetime damage could occur

without them."

**Key to success**
1) Provide a safe operation
2) Provide good equipment"

**Miscellaneous**
Work as a team no one goes home until everyone is ready

**Summary: 107**

**Contractor**
Age: 46
Logging Experience: 16 years (Took over fathers business 1980)
Education: Completed High School
Region: Coastal Plain

**Type Of Harvesting System**
Partially mechanized (2 sawyers on deck)
Product: Tree Length Pine & HW Pulp & Sawlogs
Method: Clearcut
Production (Cords): 500-600 cds/week

Quota: Yes, 600 cds/wk  Max 1000 cds/wk

Production (Tons): 1325-1590 tons/wk

Equipment: 2 Grapple Skidders
1 Feller-Buncher (Shear)
1 Loader
1 Gate Delimber
1 Truck and 2 Trailers

**Crew Data**
Number of employees: 7
Established Crew: 2-20 years
Work Week: 5 days/wk, 45 hours
Method of Payment: Hourly with bonus over 55 loads/wk

**Crew Benefits**
Crew gets 1 week paid vacation
Bonus at Christmas
Health insurance on the employees

**Crew Selection**

Crew recommends experienced people
Hires family members

**Management Style**
Owner is full-time supervisor; works mostly in woods
Foreman: Loader operator may act as foreman occasionally
Men supervise themselves

**Employee Training**
Job - No formal program
Safety - No formal program; Follow pulpmill guide lines

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Boots - Mandatory, all men on job
Ear Protection - Voluntary
Eye Protection - Voluntary
Chaps - Mandatory, deck hands

**Workers Compensation**
Experience Modification Factor: .82
Rate: $1.250/cord
Has not had to pay any small claim

**Accident History Past 5 Years**
Accident: None

**Quotes**
"Reputation is everything"

**Keys to success**

**Miscellaneous**
Uses cellular phone in pickup truck
Contractor has not been able to work on steady basis past 9 weeks due to weather

**Summary: 108**

**Contractor**
Age: 60
Logging Experience: 40 years (Started business in 1960)
Education: Did not complete High School
Region: Coastal Plain

**Type Of Harvesting System**
Partially mechanized (2 sawyers on deck)
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut
Production (Loads): 60-70 loads/wk
Production (Tons): 600-700 tons/wk
Quota: 600-700 tons/wk

Equipment: 2 Grapple Skidders
2 Feller-Bunchers, Shear
1 Loader
1 Gate Delimber
1 Crew Truck
3 Trucks and 4 Trailers

**Crew Data**
Number of Employees: 7
Established Crew: 2-15 years
Work Week: 5 days/wk, 8 Hours or 15 Loads/Day
(Time clock in crew truck records hours)
Method of Payment: Hourly (Not Guaranteed)
Son-in-laws are salaried

**Crew Benefits**
Crew gets extra $6/Day if full week completed
Crew receives 5 paid Holidays
Transportation

**Crew Selection**
Crew recommends people

**Management Style**
Owner is full-time supervisor; (Usually operates loader)
Foreman: No real foreman
Men loosely supervised

**Employee Training Job** - No formal program
Safety - No formal program

**Personal Protective Equipment**
Contractor Provided Equipment
Hard Hat - Mandatory, all men on job
Steel Toed Boots - Voluntary
Ear Protection - Mandatory, all men on job (Plugs)
Eye Protection - Mandatory, all men on job (Screens)
Chaps - Mandatory, deck hands

**Workers Compensation**
Experience Modification Factor: .82
Rate: ?
Has not had to pay any small claim

**Accident History Past 5 Years**
Accident: Broken finger from spring pole while using chainsaw (WC claim)

**Quotes**

**Miscellaneous**
Pulp and paper company conducts safety inspections on regular basis (Safety program is part of vender policy)

## Summary: 109

**Contractor**
Age: 31
Logging Experience: 3 years (Started business 1988)
Education: Completed High School & Military experience
Region: Mountains

**Type Of Harvesting System**
Non-mechanized (Manual Felling and Cable Skidding)
Product: Cut to Length Hardwood Pulp & Sawlogs
Method: Clearcut & Thinnings
Production Crew 1 & 2: 10,000 BF/wk and 10 tons of pulp/wk
Equipment: 3 Cable Skidders (1 is backup)
1 Tri-Axle Truck with KB loader

**Crew Data**
Number of Employees: 4
Crew 1 - Established Crew: 2-3 years, 2 men
Crew 2 - Established Crew: 1-2 years, 2 men
Work Week: 4 days/wk, 10 hrs/day
Method of Payment: Hourly for 40 hrs, may be more or less than 40 hours

**Crew Benefits**
Crew receives 1 wk paid vacation
Health insurance
Days off without pay if requested.

**Crew Selection**
Hires only people he knows
Tries to hire experienced workers

**Management Style**
Owner is full-time supervisor; truck driver and feller
Foreman: Owner
Men are loosely supervised; "I tell them what to do sometimes, but I don't stay on them."

**Employee Training**
Job - NORTIM safety and productivity training
Safety - NORTIM program

**Personal Protective Equipment**
Contractor Provided Equipment ($250 per man):
Hard Hat - Mandatory, all men on job
Steel Toed & Kevlar Boots - Mandatory, all men on job
Eye Protection - Mandatory, all men on job (Screen)
Ear Protection - Mandatory, all men on job (Muffs)

Chaps - Mandatory, all men on job (Kevlar or Bolistic nylon pants)

**Workers Compensation**
Receive premium discounts for safety and safety training
Experience Modification Factor: ?
Rate:
Has not had to pay any small claims

**Accident History Past 5 Years**
Accident: Owner broke leg limbing due to a spring pole (WC claim)

**Quotes**
"NORTIM training has saved about an hour per load, and I feel 100% more efficient."

**Keys to success**
1) Honesty
2) Safety
3) Good Equipment
4) Good men

**Miscellaneous**
Owner is only man that drives truck due to past experiences
Owner receive a lot of future work from recommendations

**Summary: 110**

**Contractor**
Age: 32
Logging Experience: 9 years (Started business in 1982)
Education: B.S. Forestry
Region: Piedmont

**Type Of Harvesting System**
Fully Mechanized
Product: Tree Length Pine Pulp & Sawlogs
Method: Thinning
Production: 600-700 Tons/wk
Quota: None

Equipment: 2 Grapple Skidders
1 3-Wheeled Shear
1 Loader

1 Gate Delimber
1 Truck and 3 Trailers (Contract Trucking)
2 Support Trucks

**Crew Data**
Number of Employees: 6
Established Crew: 1-7 yrs
Work Week: 5 days, 8 hrs/day
Method of Pay: Hourly 40 hrs/wk (Guaranteed)

**Crew Benefits**
One week paid vacation after 1 yrs
Paid Holidays
Transportation

**Crew Selection**
Crew recommendations, "They would not recommend someone that did not work hard."
Interviews potential employee and gives them a 30 day trial period
Small waiting list for a job on his crew
Previous knowledge

**Management Style**
Owner is a part-time supervisor; works mostly in woods
Foreman: Owner
Men are loosely supervised; "I treat them like family." ;

**Employee Training**
Job - No formal program
Safety - No formal program; safety is stressed, Have a tailgate safety talk if needed
Owner is a EMT for local FDP. Actively trains
One employee trained in first-aid

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Voluntary
Ear Protection - Voluntary
Gloves - Voluntary

**Workers Compensation**
Experience Modification Factor: ? (First year with carrier)
Rate:$24.61/$100 payroll

**Accident History Past 5 Years**
Accident 1: Cut hand with saw (WC claim)
Accident 2: Metal in hand (Owner paid)

**Quotes**

**Keys to success**

**Miscellaneous**
Contractor has cellular phone in pickup
Steams cleans woods equipment regularly
Very active in rescue squad and trains most weekends

**Summary: 111**

**Contractor**
Age: 41 (Manager of logging operation)
Logging Experience: 16 years (Started business in ?)
Education: 2 year Technician Degree Forestry
Region: Coastal Plain

**Type Of Harvesting System**
Partially mechanized (Some sawyer work at deck)
Product: Tree Length Pine Pulp & Chip-n-Saw
Method: Thinning and Clearcut
Production: 1700 Tons/Week
Quota: Yes, 1700-1800 tons/week

Equipment: 2 Grapple Skidders
2 Feller-Bunchers (Shear)
1 Loader
1 Gate Delimber
1 Crew Truck
4 Trucks and Trailers
2 Pickups

**Crew Data**
Number of Employees: 10 in woods
Established Crew: 1-16 years
Work Week: 5 days/wk, 10 hrs/day, 50 hours
Method of Payment: Hourly and foreman is salaried
Pay 1 hour travel time/day

**Crew Benefits**
Crew gets 1 week paid vacation, 2 weeks after 7 years
Pension plan an life insurance

5 paid holidays
Crew and family Health Insurance, Cost company $280/month/employee
Transportation Provided

**Crew Selection**
Interviews and requires medical exam
Written application required

**Management Style**
Brian is part-time supervisor; responsible for all woods operations
Foreman: Woods foreman runs job (Fill-in man, mechanic)
Men loosely supervised
Crew usually breaks for lunch together

**Employee Training**
Job - On the job training for equipment
Safety - No formal program; Safety, production, and financial meetings monthly

**Personal Protective Equipment**
Contractor Provided Equipment
Hard Hat - Mandatory, all men on job
Ear Protection - Mandatory, all men on job (Plugs)
Eye Protection - Mandatory, all men on job (Glasses)
Boots - Mandatory, all men on job, 50% paid by employee
Chaps - Mandatory, deck hands

**Workers Compensation**
Carrier: Hartford Insurance, Personal Policy
Experience Modification Factor: ?,
Rate: $26.84/ $100 payroll
Accident History Past 5 Years£
Accident: Limb hit man in shoulder while truck was being loaded (WC claim)

**Quotes**

**Keys to success**
1) "You're only as good as the people you have working for you
2) "Need a good company to work with"

**Miscellaneous**
British owned company that also operates phosphate mining company and farming operations (Company owns 30,000 acres)

Employee oriented company

Computerized records of employees, production etc.

Trucks equipped with on board scales

Does not have a quota, high productivity

**Summary: 112**

**Contractor**
Age: 48
Logging Experience: 40 years (Started in business ?)
Education: Did not complete High School
Region: Piedmont

**Type Of Harvesting System**
Partially mechanized (Cable Skidders, 1 Sawyer on deck)
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut
Production (Cords): 160 cds/wk

Production (Tons): 432 tons/week

Quota: Yes, 160 cds/wk Max 250 cds/wk

Equipment: 2 Cable Skidders
1 Shear Feller-Buncher
1 Loader
2 Trucks and 3 Trailers

**Crew Data**
Number of Employees: 6
Established Crew: 5 men with 6-8 years, 1 man with < 1yr
Work Week: 40 hrs/wk or until quota is filled
Method of Payment: Hourly

**Crew Pay & Benefit**
Crew receives 1 wk paid vacation
Days off with pay

**Crew Selection**
Relies on previous knowledge of person, may call around to check
2 week trial period for new employees

**Management Style**
Owner is full-time supervisor; Truck driver
Foreman: Younger brother acts as foreman when owner is away
Men supervise themselves;"Men know what to do, and do it"
Employees called "My people" wants to be just a member of crew

**Employee Training**
Job - No formal program; (usually lets man trim trees at landing to start out
Safety - No formal program; occasional tailgate meeting if there is a problem

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Ear Protection - Voluntary (Owner feels this is dangerous)
Eye Protection - Voluntary

**Workers Compensation**
Experience Modification Factor: .67
Rate: $1.19/cd
Pays small claims <$100 that are not serious

**Accident History Past 5 Years**
Accident 1: Tree fell on man 4 years ago (WC claim)
Accident 2: Cut foot with saw (WC Claim)

**Quotes**
"If you keep good equipment, then you can keep good people, men like to work with, but not on equipment."

"If I was to start telling my men how to do things they'd think I was harassing them."

**Keys to success**
1) Good equipment
2) Good employees

**Miscellaneous**
Contractor on quota, and only able to run 3-4 days per week
Uses a scraper attachment to skidder for cleaning mud off public roads

**Summary: 113**

**Contractor**
Age: 51
Logging Experience: 40 years (Started in business ?)
Education: Did not complete High School
Region: Piedmont

**Type Of Harvesting System**
Partially mechanized (Cable Skidders and some sawyer work)
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut
Production (Cords): 160 cds/wk, Quota 160 cds/wk, Max 200+ cds/wk
Production (Tons): 432 tons/wk
Equipment: 2 Cable Skidders
1 Feller-Buncher (Shear)
1 Loader
1 Gate Delimber
2 Trucks and 3 Trailers

**Crew Data**
Number of Employees: 6
Established Crew: 5 men with 10+ years, 1 man with < 1yr
Work Week: 40 hrs/wk or quota is filled
Method of Payment: Hourly for 40 hrs/wk (Guaranteed)

**Crew Benefits**
Crew receives 1 wk paid vacation
Reasonable requests for days off with pay

**Crew Selection**
Relies on previous knowledge and attitude of the person, and tries to select experienced men

**Management Style**
Owner is part-time supervisor; office work (not on job daily)
Foreman: Sons acts as foreman when owner is away
Men supervise themselves; "Men know what to do, and do it"

**Employee Training**
Job - No formal program
Safety - No formal program

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job

Chaps - Mandatory, deck hands
Gloves- Mandatory, skidder operators
Steel Toed Boots - Mandatory, all men on job
Ear Protection - Voluntary
Eye Protection - Voluntary

**Workers Compensation**
Experience Modification Factor: .67
Rate:
Pays small claims <$100 that are not serious

**Accident History Past 5 Years**
**Accident: Cut foot with saw (WC claim)**

**Quotes**
"Your skidder does not have a brain and if you find out the operator does not you'd better get rid of him."

"A man has to hear in the woods, ear protection is dangerous"

"Safety keeps production consistent and men working."

**Keys to success**

**Miscellaneous**
Contractor on quota, and is able to work 3-4 days per week

**Summary: 114**

**Contractor**
Age: 41
Logging Experience: 15 years
Education: Completed High School
Region: Piedmont

**Type Of Harvesting System**
Partially Mechanized (Some manual felling of hardwoods)
Product: Tree Length Pine & HW Pulp & Sawlogs
Method: Clearcut
Production (TL): 35 Loads/wk, 3 Loads Sawlogs
Production (Tons): 900 tons/wk

Equipment: 1 Grapple Skidder
1 Feller-Buncher (Shear)
1 Loader with sawbuck

1 Gate Delimber
3 Trucks and 6 Trailers

**Crew Data**
Number of Employees: 5
Established Crew: 1-15 years
Work Week: 4.5 days, 10 hrs/day
Method of Pay: Production ($/Load), Foreman salary

**Crew Benefits**
One week paid vacation
Major Holidays with pay
Christmas bonus, varies with years service
Money advances
Transportation to job

**Crew Selection**
Hires only experienced men

**Management Style**
Owner is a full-time supervisor; works mostly in woods
Foreman: Loader operator when owner is away
Men supervise themselves "We get along with each other"

**Employee Training**
Job - No formal program
Safety - No formal program; safety talks occasionally
Owner has First-Aid training, Ex-Volunteer fireman

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Voluntary (Glasses)
Ear Protection - Voluntary (Plugs)

**Workers Compensation**
Experience Modification Factor: 1.06 ?
Rate: $24.61/$100 payroll

**Accident History Past 5 Years**
Accident: Broken leg climbing off equipment, 5 years ago (WC claim)

**Quotes**

**Key to Success**
1) A good company to cut for
2) Modern equipment

3) Steady pace

**Summary: 115**

**Contractor**
Age: 30
Logging Experience: 11 years (Started business 1980)
Education: Completed High School
Region: Mountains

**Type Of Harvesting System**
Non-mechanized (Manual Felling and Cable Skidding)
Product: Cut to Length Hardwood Pulp & Sawlogs
Method: Clearcut & Thinnings
Production: 20,000 BF/wk
100 tons pulp/wk

Quota: Yes, 100 tons pulp/wk

Equipment: 1 Cable Skidder
1 Dozer
2 Contracted Trucks (Owned by sawmill)

**Crew Data**
Number of Employees: 3
Established Crew: 2 men with 8-11 yrs, 1 man with 1-2 yrs
Work Week: 6 days/wk, 10 hrs/day
Method of Payment: Hourly (Not Guaranteed)

**Crew Benefits**
Health insurance
Days off without pay if requested.

**Crew Selection**
Hires someone that will work in the woods on a daily basis, and has woods experience

**Management Style**
Owner is full-time supervisor; feller and dozer operator
Foreman: Owner
Men are closely supervised; "I tell them what to do, and where to cut. I lay out all the jobs myself"
"We are a close group."

**Employee Training**
Job - NORTIM safety and productivity training
Safety - NORTIM, and tailgate sessions when needed

**Personal Protective Equipment**

Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Eye Protection - Mandatory, all men on job (Screens)
Ear Protection - Mandatory, all men on job (Muffs)
Chaps - Mandatory, all men on job (Kevlar Pants)
Gloves - Mandatory, skidder operator
Employee Provided Equipment:
Steel-Toed & Kevlar Boots - Mandatory, all men on job

**Workers Compensation**
Carrier: Contract through NORTIM with various insurance companies
Receive premium discount for safety and safety training
Experience Modification Factor: ? (First year with carrier)
Rate: $1.31/ton and $5.19/MBF
Has paid small claims for small cuts

**Accident History Past 5 Years**
Accident: Owner broke hand from falling limb (WC claim)

**Quotes**
"NORTIM training has increased production by 1 load of pulpwood and 1 load of sawlogs per week."

"Since NORTIM, I get more production with less wear on equipment."

**Keys to success**
1) Start small and wok up
2) Knowledge of equipment
3) Do quality work

**Miscellaneous**
Company quality logger
Safety committee member on NORTIM council
Very conscientious worker, works on a lot of State sales

**Summary: 116**

**Contractor**
Age: 58
Logging Experience: 31 years (Started business in 1960)
Education: B.S. Forest Products
Region: Coastal Plain

**Type Of Harvesting System**
Partially mechanized (1 deck hand)

Product: Tree Length Pine Pulp & Chip-n-Saw
Method: Clearcut
Production: Crew 1: 80 Loads/wk (1760 Tons/wk)
Crew 2: 2000 Tons/wk WTC
Crew 3: 1500 tons/wk WTC

Equipment Crew 1: 1 Grapple Skidder
1 Feller-Buncher (Shear)
1 Loader
16 Trucks for both crews

Crews 1-3: (Not observed)

**Crew Data**
Crew 1: Data being reviewed
Crew 2:
Work Week: 5 days/wk, 12 hrs/day 60 hours
Overtime for 40+ hours
Method of Payment: Hourly and salary for foreman

**Crew Pay & Benefits**
Crew gets 1 week paid vacation after 3 yrs; 2 weeks after 20 years
Paid Holidays
Gifts for years of employee service
Crew 60% Health and Foreman 100% Health Insurance
Uniforms at employees expense
Company profit sharing
Transportation to job

**Crew Selection**
Work through employment agency that screens applicants
Requires medical exam, drug testing, and accident history

**Management Style**
Owner manages office
Foreman: One on each crew, responsible for all woods operations
Men are loosely supervised

**Employee Training Job** - No formal program
Safety - No formal program; Foreman has first-aid training
Cook outs for trucking every 250,000 miles driven safely
Drug testing program for all employees

**Personal Protective Equipment**
Contractor Provided Equipment

Hard Hat - Mandatory, all men on job
Ear Protection - Voluntary
Eye Protection - Voluntary
Chaps - Mandatory, deck hands

**Workers Compensation**
Experience Modification Factor: ?
Rate: $26/$100 of pay roll
Has not had to pay a small claim

**Accident History Past 5 Years**
Accident: None

**Quotes**
"I care about my men"
"Safety helps your image and helps you get cheap insurance"

**Keys to success**
1) Detailed computerized cost information for all phases of operation

**Miscellaneous**
Does not have a wood quota; high level of productivity

Trucks are equipped with on board scales

All drivers have passed CDL training program

Operates four crews; 2 produce WTC for fiber and 1 produces WTC for fuel

Operates a maintenance shop with 2 full-time mechanics

**Summary: 117**

**Contractor**
Age: 38
Logging Experience: 10 years (Started in business in 1980)
Education: Completed College (B.S. Sociology)
Region: Piedmont

**Type Of Harvesting System**
Partially Mechanized (1 Sawyer on deck)
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut and Thinning
Production (Tons): 3000 tons/wk

Equipment: 2 Grapple Skidders
1 Feller-Buncher (Shear)
1 3-Wheeled Feller-Buncher with chainsaw
1 Maintenance Truck
2 Loaders in tandem one with CTR delimber
21 Trucks in dispatch system

**Crew Data**
Number of Employees: 8 (In woods) Number of Crews: 2
Established Crew: 2-12 years
Work Week: 5 days, 9 hrs/day
Method of Pay: Hourly

**Crew Benefits**
One week paid vacation
Major Holidays with pay
Profit sharing
Transportation to job

**Crew Selection**
Previous knowledge and experience

**Management Style**
Owner is a part-time supervisor; works mostly in office
Foreman: Son is foreman (Crew 1) 1 foreman (Crew 2)
Men supervise themselves; "Men have very good work attitude"

**Employee Training**
Job - No formal program
Safety - No formal program; safety and productivity meeting weekly
Will have formal program in near future as part of pulpmill certified logger program

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Mandatory (Glasses)
Ear Protection - Voluntary (Plugs)

**Workers Compensation**
Experience Modification Factor: 1.41
Rate: $1.37/cd Rebate: 10.2%

**Accident History Past 5 Years**
Accident 1: Injured back requiring surgery (WC claim)

Accident 2: Chainsaw cut (WC claim)

Accident 3: Over the road tractor in accident
(Contractor not at fault) paid claim

**Quotes**
"I feel that paying on production is dangerous"

**Keys to success**
1. Constant markets for wood
2. Good equipment
3. Hire experienced men or train them well

**Miscellaneous**
Trucking is scheduled through dispatch system established with another logger working in same area (Operated by two full time dispatch employees)
Trucks equipped with super-singles and aluminum rims
Quality control very important
Contractor is rarely on a quota

**Summary: 119**

**Contractor**
Age: 41-46-35
Logging Experience: 30+ years (Took over father's business in 1980)
Education: Completed High School
Region: Piedmont

**Type Of Harvesting System**
Fully mechanized
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut
Production (Cords): 180 cds/wk

Production (Tons): 486 tons/wk

Quota: Yes, 180 cds/wk Max: 300 cds/wk

Equipment: 2 Grapple Skidders (1 is backup)
1 Shear Feller-Buncher
1 Loader with CTR Delimber
1 Gate Delimber
1 Crew Truck
2 Trucks and 6 Trailers
1 Low boy

**Crew Data**
Number of Employees: 4
Established Crew: 3 men with 20+ years, 1 man with 4 yrs
Work Week: 5 days/wk or until quota is filled
Method of Payment: Salary

**Crew Benefits**
Crew receives 1 wk paid vacation
Paid Holidays
Days off with pay
Uniforms Provided
Transportation to job

**Crew Selection**
Relies on previous knowledge of individual
Selects men with chainsaw experience and married

**Management Style**
Owners are full-time supervisors; loader operator
Foreman: No real foreman men work as team
Men supervise themselves;"Men know what to do, and do it"

**Employee Training**
Job - No formal program
Safety - No formal program; 2 men know CPR and first aid

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hand
Eye Protection - Voluntary
Ear Protection - Voluntary

**Workers Compensation**
Experience Modification Factor: .67
Rate: $1.19/cord
Pays small claims <$100 that are not serious

**Accident History Past 5 Years**
Accident 1: Broken foot with hydraulic cylinder (WC claim)
Accident 2: Limb hit cutter in neck (WC claim)

**Quotes**
"One of the reasons I bought my CTR was to get men off the ground."

**Keys to success**

1) Good equipment and experienced workers
2) Put in a lot of wood to the mill and keep your cost down

**Miscellaneous**
Contractors on low quota that allows them to produce only 180 cds/wk

**Summary: 119**

**Contractor**
Age: 58
Logging Experience: 17 years (Started business 1973)
Education: Completed High School
Region: Coastal Plain

**Type Of Harvesting System**
Partially mechanized (2 sawyers on deck)
Product: Tree Length Pine & HW Pulp & Sawlogs
Method: Clearcut
Production: 90 Loads/Week , 500-600 cds/week (900 Tons/WK)
Quota: Yes, 500-600 cds/wk

Equipment: 2 Grapple Skidders
1 Feller-Buncher (Sawhead)
1 Loader
1 Gate Delimber
1 Crew Truck
3 Trucks and 3 Trailers

**Crew Data**
Number of Employees: 9
Established Crew: 4-16 years, 1 man with <1 year
Work Week: 5 days/wk, 40 hours
Method of Payment: Weekly (Not Guaranteed)

**Crew Benefits**
Crew gets 2 weeks paid vacation
Bonus at Christmas
Transportation to job

**Crew Selection**
Crew recommends experienced people
Hires only experienced men
Work History (Required by insurance carrier)

**Management Style**
Owner is full-time supervisor, works mostly in woods

Foreman: Son acts as the foreman when owner is away
Men not directly supervised,

**Employee Training**
Job - No formal program
Safety - No formal program (Follow pulpmill safety guide lines for vender policy)

**Personal Protective Equipment**
Contractor Provided Equipment
Hard Hat - Mandatory, all men on job
Boots - Mandatory, all men on job
Ear - Mandatory, all men on job (Plugs)
Eye Protection - Mandatory, all men on job, (Glasses)
Chaps - Mandatory, deck hands

**Workers Compensation**
Experience Modification Factor: ?
Rate: $1.13 /cord
Has not had to pay any small claim

**Accident History Past 5 Years**
Accident: Bruised foot working on deck (WC claim)

**Quotes**
"I don't make the men wear chaps if it's real hot"

Keys to success: "You need good help, a good company to work for, and do the best job you can"

**Miscellaneous**
Pulp and paper company regularly inspects job for safety (Safety program is part of vender policy)

**Summary: 120**

**Contractor**
Age: 29
Logging Experience: 12 years (Started business in 1983)
Education: Completed High School
Region: Coastal Plain

**Type Of Harvesting System**
Partially mechanized (2 Sawyers on deck)
Product: Tree Length Pine & Hardwood Pulp & Sawlogs

Method: Clearcut
Production: Crew 1: 50 loads Pine/wk
Crew 2: 30 Loads HW/wk
Production (Tons): Crew 1: 1100 tons/wk
Crew 2: 660 tons/wk

Equipment Crew 1: 2 Grapple Skidders
1 Feller-Buncher (Sawhead)
1 Loader
2 Trucks and 2 Trailers
1 Service Truck
1 Crew Truck

Crew 2: (not observed)

**Crew Data**
Number of Employees: 12
Crew 1 - Established Crew: 4-6 years, 6 men, Pine
Crew 2 - Established Crew: 1-2 years, 6 men, HW
Work Week: 5 days/wk, 8 hrs/day, or until quota is filled for week
Payment: Production ($/cord)

**Crew Benefits**
Crew receives 1 wk paid vacation at Christmas
$200 bonus at Christmas
Money advances
Uniforms Provided
Transportation to job

**Crew Selection**
Crew recommendations
Hires men with woods experience

**Management Style**
Owner is part-time supervisor, works mostly in woods
Foreman: Loader operator acts as foreman when owner is away
Men supervise themselves,"Men know what to do, and do it."
Men get the same amount of work done if owner is not on job

**Employee Training**
Job: No formal program; Contractor watches new men to see how he works
Safety - No formal program

**Personal Protective Equipment**

Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Ear Protection - Voluntary
Eye Protection - Voluntary

**Workers Compensation**
Experience Modification Factor: .83
Rate:
Pays small claims that are not serious

**Accident History Past 5 Years**
Accident: Broken arm from fallen tree (WC claim)

**Quotes**

**Miscellaneous**
Operates shop for maintenance and repair of woods equipment and trucks

Does not keep insurance on equipment after it is paid for

**Summary: 121**

**Contractor**
Age: 37
Logging Experience: 17 years (Started in business in 1973)
Education: Completed High School and 3 yrs of college
Region: Piedmont

**Type Of Harvesting System**
Partially Mechanized (2 Sawyers on deck, 1 in woods)
Product: Tree Length Pine and Hardwood Pulp & Sawlogs
Method: Clearcut
Production (Cords): 400 cds/wk
Production (Tons): 1080 tons/wk
Quota: Yes, Max: 650 cds/wk

Equipment: 1 Grapple Skidder
1 Feller-Buncher (Shear)
1 Maintenance Truck
1 Loader
3 Truck and 4 trailers (Contract 2 others)
1 Gate Delimber

**Crew Data**

Number of Employees: 5 in woods 2 truck drivers
Established Crew: 2-15 years
Work Week: 5 days, 11 hrs/day
Method of Pay: Production ($/cd)

**Crew Benefits**
Holidays if pulpmill is shut down
Transportation to job
Christmas bonus

**Crew Selection**
Previous knowledge
In woods experience

**Management Style**
Owner is a full-time supervisor; works mostly in woods
Foreman: Owner
Men are closely supervised

**Employee Training**
Job - No formal program
Safety - No formal program

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Voluntary (Glasses)
Ear Protection - Voluntary (Plugs)

**Workers Compensation**
Experience Modification Factor: .87
Rate: $19.73/$100 payroll

**Accident History Past 5 Years**
Accident: None

**Quotes**

**Keys to success**
1. Work hard
2. Good business
3. Take care of the land

Miscellaneous
Maintenance conducted at shop on regular schedule

**Summary: 122**

**Contractor**
Age: 38
Logging Experience: 15 years (Started in business in 1975)
Education: Completed High School
Region: Piedmont

**Type Of Harvesting System**
Partially Mechanized (1 Sawyer on deck)
Product: Tree Length Pine and Hardwood Pulp & Sawlogs
Method: Clearcut
Production (Cords): 400 cds/wk, Quota 400 cds/wk
Production (Tons): 1080 tons/wk

Equipment: 2 Grapple Skidders
1 Feller-Buncher (Shear)
1 Maintenance Truck
1 Loader
2 Trucks and trailers

**Crew Data**
Number of Employees: 6
Established Crew: 2-15 years
Work Week: 5 days, 10 hrs/day
Method of Pay: Production ($/cd)

**Crew Benefits**
Holidays if Union Camp is shut down
Transportation to job
Uniforms

**Crew Selection**
Previous knowledge and experience

**Management Style**
Owner is a full-time supervisor; works mostly in woods
Foreman: Owner
Men are loosely supervised

**Employee Training**
Job - No formal program
Safety - No formal program

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Voluntary, deck hands
Eye Protection - Voluntary (Glasses)

Ear Protection - Voluntary (Plugs)

**Workers Compensation**
Experience Modification Factor: ?
Rate: $17.57/$100 payroll, woods workers
$7.50/$100 payroll, truckers

**Accident History Past 5 Years**
Accident: None

**Quotes**

**Keys to success**
1. Safety
2. Good help

Miscellaneous
Maintenance conducted at shop on regular schedule

**Summary: 123**

**Contractor**
Age: 56
Logging Experience: 23 years (Started in business in 1968)
Education: Completed High School
Region: Costal Plain

**Type Of Harvesting System**
Partially Mechanized (2 Sawyers on deck)
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut and Thinning
Production (Loads): 80 loads/wk
Production (Tons): 2000 tons/wk

Equipment: 3 Grapple Skidders
1 Feller-Buncher (Sawhead)
1 Maintenance Truck
1 Loader
6 Trucks and trailers
1 Gate Delimber

**Crew Data**
Number of Employees: 16
Established Crew: 2-17 years,
Work Week: 5 days, 9 hrs/day
Method of Pay: Paid by the day and production bonus

**Crew Benefits**
Paid days off
Transportation to job

**Crew Selection**
Previous knowledge and experience
Experienced workers

**Management Style**
Owner is a full-time supervisor; works mostly in woods
Foreman: 2 sons may act as foreman
Men supervise themselves

**Employee Training**
Job - No formal program
Safety - No formal program; safety and CPR training will start before the end of 1991

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Voluntary (Glasses)
Ear Protection - Voluntary (Plugs)

**Employee Provided Equipment**
Steel-Toed Boots- Mandatory, all men on job

**Workers Compensation**
Carrier: Morris Temple
Experience Modification Factor: ?
Rate:

**Accident History Past 5 Years**
0 accidents

**Quotes**

**Keys to success**
"Work hard and stay at it"

**Miscellaneous**
Maintenance conducted at shop on regular schedule

## Summary: 124

**Contractor**
Age: 38
Logging Experience: 20 years (Started in business in 1981)
Education: Completed High School and Military Service
Region: Costal Plain

**Type Of Harvesting System**
Partially Mechanized (2 Sawyers on deck)
Product: Tree Length Pine Pulp & Sawlogs
Method: Clearcut
Production (Loads): 75 loads/wk
Production (Tons): 2000 tons/wk
Quota: No

Equipment: 2 Grapple Skidders
1 Feller-Buncher (Sawhead)
1 Maintenance Truck
2 Loaders
4 Trucks and trailers
1 Gate Delimber

**Crew Data**
Number of Employees: 12
Established Crew: 1-15 years, 2 truckers <1 year
Work Week: 6 days, 10 hrs/day
Method of Pay: Paid by the day

**Crew Benefits**
Paid vacation after one year
Transportation to job
Uniforms offered at employee's expense
Health Insurance (employee and family)
Sick leave (7 days/year)

**Crew Selection**
Previous knowledge and experience
Experienced workers
CDL drivers only

**Management Style**
Owner is a full-time supervisor; works mostly in woods
Foreman: 2 brothers act as foreman
Men supervise themselves; "They have a high morale"

**Employee Training**
Job - No formal program

Safety - Formal program; safety and CPR training will start before the end of 1991
Written safety plan

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Mandatory (Glasses)
Ear Protection - Mandatory (Plugs)

**Workers Compensation**
Experience Modification Factor: .80
Rate: $44.41/$100 payroll woods crew
$28.00/$100 payroll truckers

**Accident History Past 5 Years**
Accident 1: Eye injury from battery explosion (WC claim)
Accident 2: Knee injury possibly unrelated to work (WC claim)

**Quotes**
"Safety keeps production consistent and insurance cost down"

**Keys to success**
1. Planning
2. Hard work
3. Loaded trucks

**Miscellaneous**
Maintenance conducted at shop on regular schedule
Logger of the year 1990-91
Chairman of local county

**Summary: 125**

**Contractor**
Age: 57
Logging Experience: 43 years (Started in business in ?)
Education: Completed High School
Region: Piedmont

**Type Of Harvesting System**
Partially Mechanized (3 Sawyers on deck)
Product: Tree Length Pine and Hardwood Pulp & Sawlogs

Method: Clearcut and Thinning
Production (Loads): 110 loads/wk
Production (Tons): 2420 tons/wk

Equipment Crew 1: 2 Grapple Skidders
1 Feller-Buncher (Sawhead)
1 Maintenance Truck
1 Loader
2 Trucks and trailers/crew
1 Gate Delimber

Equipment Crew 2: Not observed

**Crew Data**
Number of Employees: 11 Number of Crews: 2
Established Crew: 1-20 years,
Work Week: 5 days, 10 hrs/day
Method of Pay: Hourly

**Crew Benefits**
Transportation to job
Helps employees when he can

**Crew Selection**
Previous knowledge
Experienced workers

**Management Style**
Owners are part-time supervisors; work mostly in office
Foreman: Loader operator
Men supervise themselves

**Employee Training**
Job - No formal program
Safety - No formal program, Has regular safety meetings

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Voluntary (Glasses)
Ear Protection - Voluntary (Plugs)
Employee Provided Equipment:
Steel-Toed Boots - Mandatory

**Workers Compensation**
Experience Modification Factor: ?
Rate: $26.55/$100

**Accident History Past 5 Years**
None

**Quotes**
[Equipment] "I use it, not abuse it"

**Keys to success**

**Miscellaneous**
Maintenance conducted at shop on regular schedule
Owner is partner in rodeo business and land investments

**Summary: 126**

**Contractor**
Age: 38 and 37
Logging Experience: 16 years (Started in business in 1975)
Education: Completed High School
Region: Piedmont

**Type Of Harvesting System**
Partially Mechanized (1 Sawyer on deck)
Product: Tree Length Pine and Hardwood Pulp & Sawlogs
Method: Clearcut and Thinning
Production (Loads): 25 loads/wk
Production (Tons): 550 tons/wk

Equipment: 1 Grapple Skidders
1 Cable Skidder (Back up)
1 3 Wheeled Bell FB (Bar & Cain Sawhead)
1 Maintenance Truck
1 Loader
2 Trucks and trailers
1 Gate Delimber

**Crew Data**
Number of Employees: 4
Established Crew: 2-16 years,
Work Week: 5 days, 9 hrs/day, Early on Fridays
Method of Pay: Paid by the day

**Crew Benefits**
Transportation to job

**Crew Selection**
Previous knowledge, mostly relatives

Experienced workers

**Management Style**
Owners are full-time supervisors; work mostly in woods
Foreman: No
Men supervise themselves

**Employee Training**
Job - No formal program
Safety - No formal program

**Personal Protective Equipment**
Contractor Provided Equipment:
Hard Hat - Mandatory, all men on job
Chaps - Mandatory, deck hands
Eye Protection - Voluntary (Glasses)
Ear Protection - Voluntary (Plugs)

**Workers Compensation**
Experience Modification Factor:.62 ?
Rate: $26.55/$100 ?

**Accident History Past 5 Years**
None

**Quotes**
"Quotas are not all bad, at least you know what to expect"

**Keys to success**
Stay steady and keep away from high production

**Miscellaneous**
Maintenance conducted at shop on regular schedule

## VITA

The author, Richard G. Sluss, was born August 25, 1967 to Randal and Hannah Sluss. His childhood was spent mostly in Centreville, Virginia, a bedroom community to the Washington, D.C. area, where he played in the large wooded areas behind and near his house. Influenced by his mother's work as secretary for the U.S. Forest Service and his families Appalachian heritage which had always intrigued him, he became interested in forestry and agriculture at a early age. After attending the FWRI program at Virginia Tech during high school, where he met many of his future classmates, he decided to enroll in Virginia Tech's School of Forestry and Wildlife Resources.

While attending college the author became a member and actively involved in Society of American Foresters, Xi Sigma Pi, Forestry Club, and Kappa Sigma Fraternity. In addition, he worked as a forester through the Cooperative Education program for Virginia Power in Richmond, Virginia.

After graduating in 1990, he worked for five months in Denmark for The Danish Institute of Forest Technology, and three months for Westvaco Timberlands in Appomattox, Virginia. He returned to VA Tech in January of 1991 and

completed the Master of Science degree in Industrial Forestry Operations in August, 1992. In September, he started work as a forester with Champion International Corporation in Augusta, Georgia.

Rick Sluss