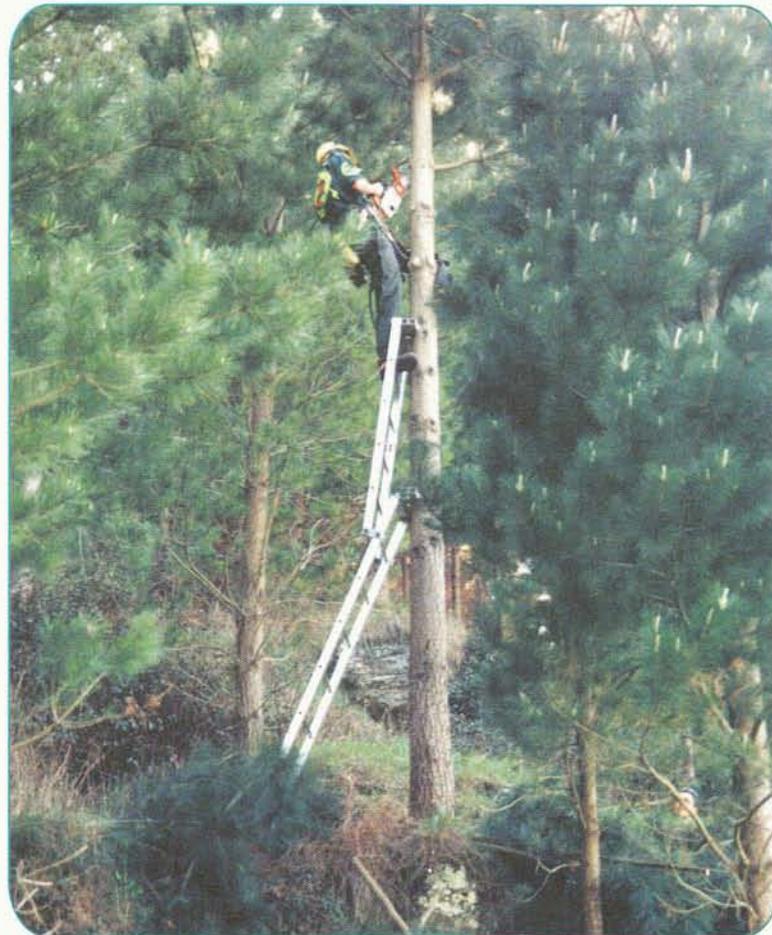


The Forest Silviculture Accident Reporting Scheme

Summary of Reports - 1998

Tina Cummins
Human Factors Researcher



Summary

This report summarises the information supplied to the Forest Silviculture Accident Reporting Scheme (ARS) for 1998. This is the ninth year of data collection.

- 131 injuries and incidents were reported for 1998 (164 for 1997, 166 for 1996)
- 46 Lost Time Injuries (LTI) resulted in 359 lost work days (67 injuries, 294 lost work days in 1997; 84 injuries, 434 lost work days in 1996)
- An average of 8.3 days were lost per injury (4.4 in 1997). The increase in severity was due to an increase in the number of fractures.

- Most injuries (66%) resulted in the loss of one to five days
- Injuries peaked in February, consistent with previous years. February is the first full month back at work after the Christmas break, and is traditionally a high injury month with higher daily temperatures contributing to increased worker fatigue.

 **Liro**
Forestry Solutions

Private Bag 3020, Rotorua, New Zealand
Telephone: +64 7 348 7168 Facsimile: +64 7 346 2886
Email: tina.cummins@forestresearch.co.nz

- More (26%) injuries occurred during 11.00am and noon, with 70% of these occurring between 11.30am and 11.45am. Previous reports have shown two injury peaks at 10.00am and 1.00pm (Cummins, 1998, Byers and Parker, 1997). This could indicate a change from two smokos to one, with the long work period before the meal break contributing to reduced energy levels and worker fatigue.
- Sprain/strain type injuries were most common (35%), which is consistent with 1997 (37%).
- Pruning recorded 60% sprain/strain injuries (44% in 1997) and 50% lacerations (50% in 1997). Improving the grip on ladder rungs may reduce these injuries.
- Five fractures were recorded in pruning and plotting, increasing the average severity of all lost time injuries. One fracture occurred when the worker fell off the third ladder rung of the ladder, caused by the ladder shifting after being incorrectly positioned.
- Near miss incident reporting remains consistent, with 42 reported in 1998 (41 in 1997)
- Most minor injuries occurred in pruning

Acknowledgments

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Definitions

Forest Silviculture	Includes the following operations: nursery work, establishment, releasing, thinning to waste, pruning and forest maintenance
Lost Time	The injury causes the injured person to miss the next full day's scheduled work
Minor	First aid or medical treatment required, but no lost time as defined above
Near Miss	First aid or medical treatment not required but the incident could have caused injury or property damage

Injuries

Forest silviculture recorded 131 injuries and incidents for 1998 (Table 1). This is less than the number recorded for 1997, and could indicate under reporting, a drop in the number employed in forestry activities, or improved safety in silviculture. The number of near miss incidents reported is similar to 1997, indicating consistent levels of near miss reporting.

Report Type	1995	1996	1997	1998
Lost Time	84	84	67	46
Minor	52	53	56	43
Near Miss	14	29	41	42
Total Reports	150	166	164	131

Table 1 - Injuries and incidents recorded by the ARS

Analysis of Lost Time Injuries

Lost time per injury

The average number of days lost per injury was 8.3, which was more than the 1996 (5.2 days) and 1997 (4.4) figures. The number of days lost per injury ranged from one day to 60 days, with median of four days, more than the three day median found in 1997, 1996, and 1995 (Cummins, 1998; Byers and Parker, 1997; Parker, 1997). The increase in the median number of days lost per injury shows the impact of increased severity from injuries such as fractures. It could also indicate under reporting, as less severe cases are more easily "hidden" than the more severe cases.

The total number of work days lost in 1998 was 359 (Figure 1). This is more than 1997 (294), but less than the 1996 (434) and 1995 (474) figures (Cummins, 1998; Byers and Parker, 1997; Parker, 1997).

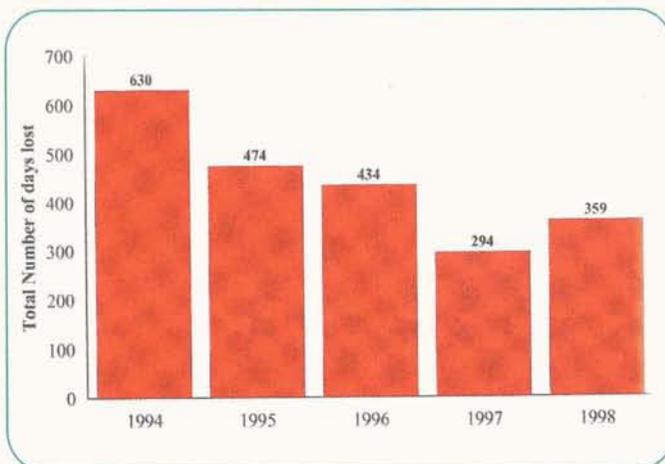


Figure 1 - Total number of days lost

Most injuries (66%) resulted in the loss of one to five days work, following the trend of previous years (Figure 2). However, 1998 figures show an overall reduction in lower severity injuries, and an increase in higher severity injuries. This reflects the occurrence of five fractures which resulted in 30 days and 60 days lost time.

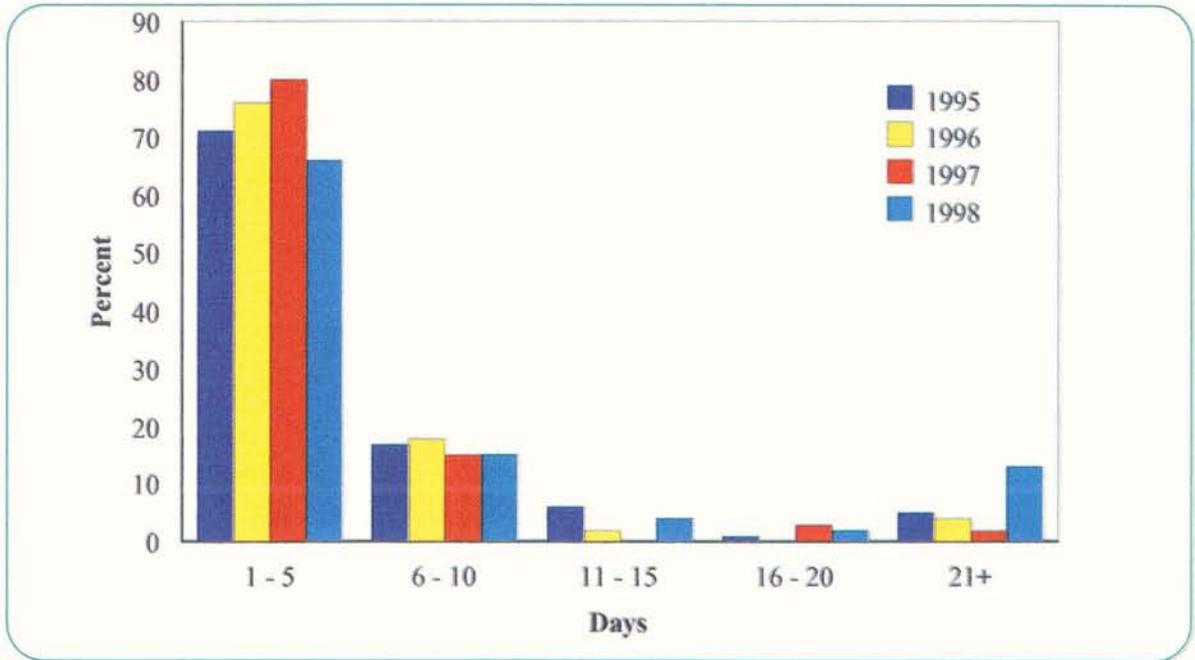


Figure 2 - Days lost per injury

Time of Injury Occurrence

Month of year

Forestry injuries peaked in February (Figure 3), continuing a trend found in both the logging and forestry ARS. February is the first full month of work after the holiday break, and is traditionally a high injury month in the forest industry. This reflects the higher daily temperatures associated with summer and reduced fitness and body conditioning after the holiday break. These factors collectively contribute to higher levels of worker fatigue, and greater risk of injury. Introducing a fatigue awareness programme may prove effective in reducing injury rates at this time of year.

The highest number of injuries recorded in February occurred during pruning, consistent with 1996 and 1997. Pruning is the main forestry operation carried out at this time of year.

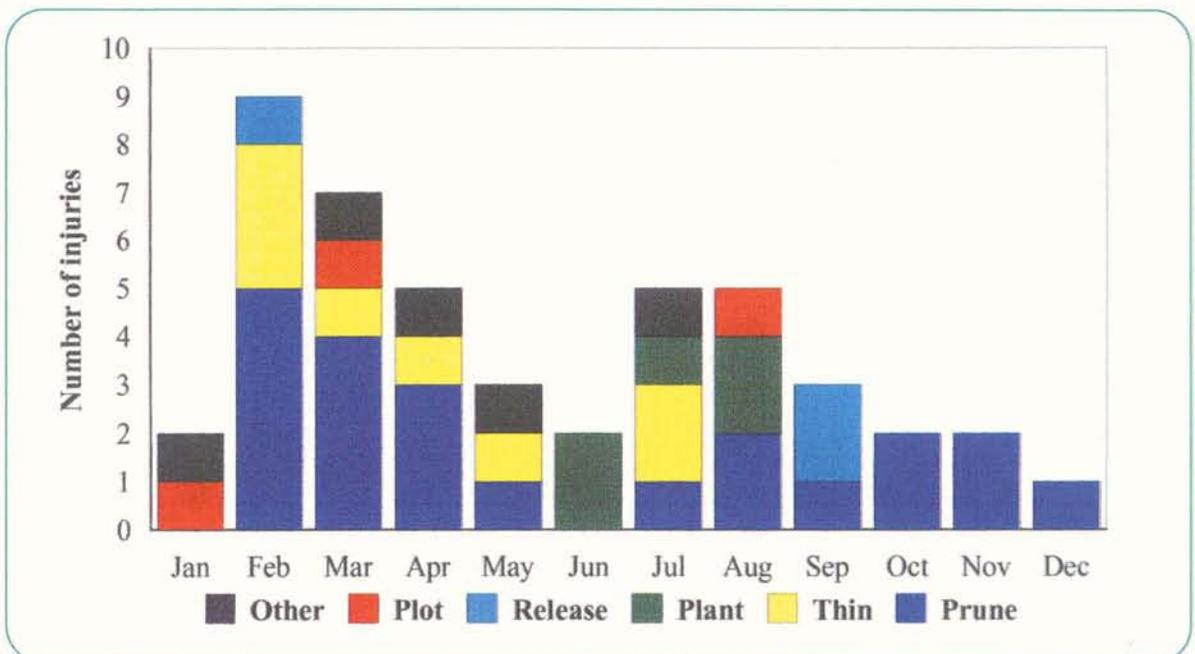


Figure 3 - Injuries by month and operation - 1998

Day of week

More injuries occurred on Monday and Wednesday than any other day of the week (Figure 4). This is a move away from the 1996 reported trend for injuries to occur on Tuesdays. Pruning injuries accounted for 58% of injuries occurring on a Monday. The increase in injuries occurring on a Friday may reflect increased fatigue levels in the industry resulting from longer work hours.

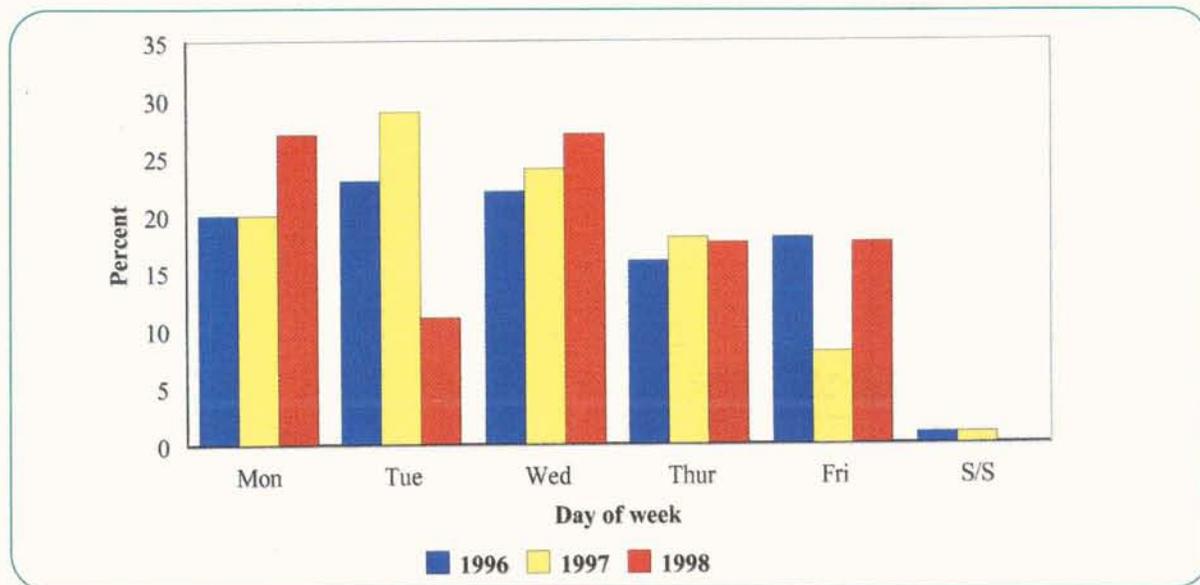


Figure 4 - Injury by day of week

Time of day

More injuries (26%) were reported during 11.00am and 11.59am; 70% of these occurring in the quarter hour between 11.30am and 11.45am (Figure 5). This differs from the 1997 findings, where two injury peaks were recorded at 10.00 - 10.59am and 1.00 - 1.59pm. These peaks were reported as reflecting increased fatigue levels in workers prior to a meal break. The 1998 result could indicate a shift to one smoko between 11.00 - 11.59am, with increased levels of fatigue arising from the long shift prior to smoko.

Increasing injury levels at 2-3.00pm could be the result of a fatiguing workforce. Eating a good breakfast will provide the worker with sustained energy for about four hours at forest worker energy expenditure levels (Kirk, Gilbert and Darry, 1996). To sustain the level of performance required for silvicultural operations, it is important that breakfast is then followed with regular input of carbohydrate and fluid throughout the day. Rest breaks are also effective at reducing the onset of fatigue as they allow the body to reduce the average daily heart rate. They also enable the body to divert energy to break down the food just eaten, so the energy is available for the following run. If only one break is taken, productivity will drop to a lower level as the body tries to conserve energy (Liro Forestry Solutions, 1999).

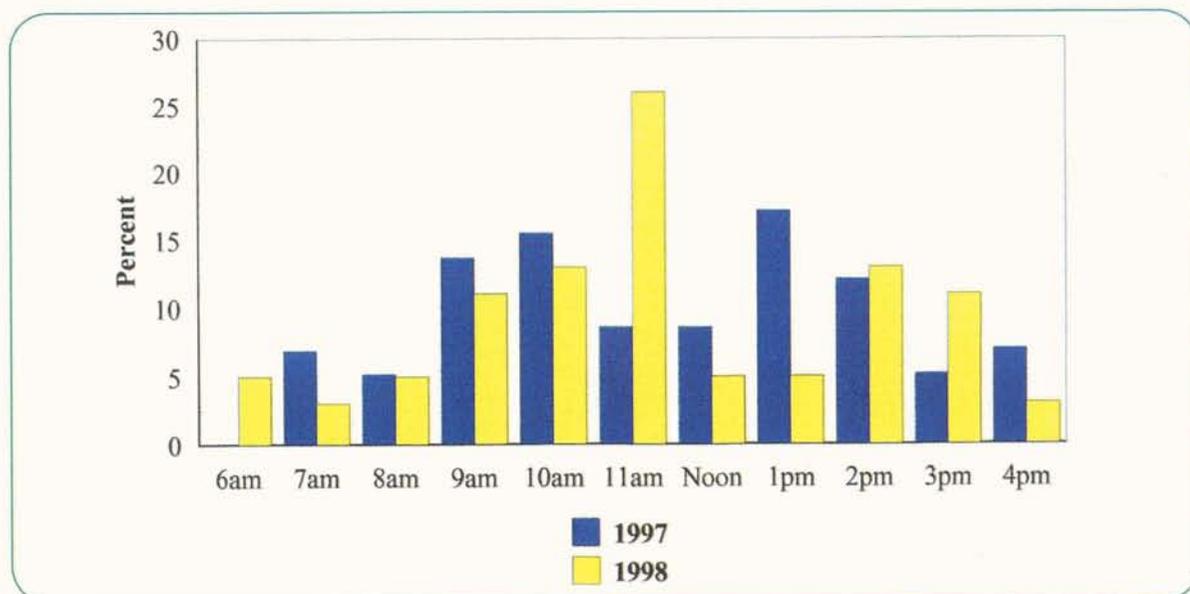


Figure 5 - Injury by time of day

Experience

Higher levels of experience were associated with lost time injuries for 1998, with 76% of injured workers having worked for one year or more (Figure 6). Information relating to experience was provided in 80% of injury reports. This information is beneficial when analysing injury results, as it provides an insight to the cause of injury.

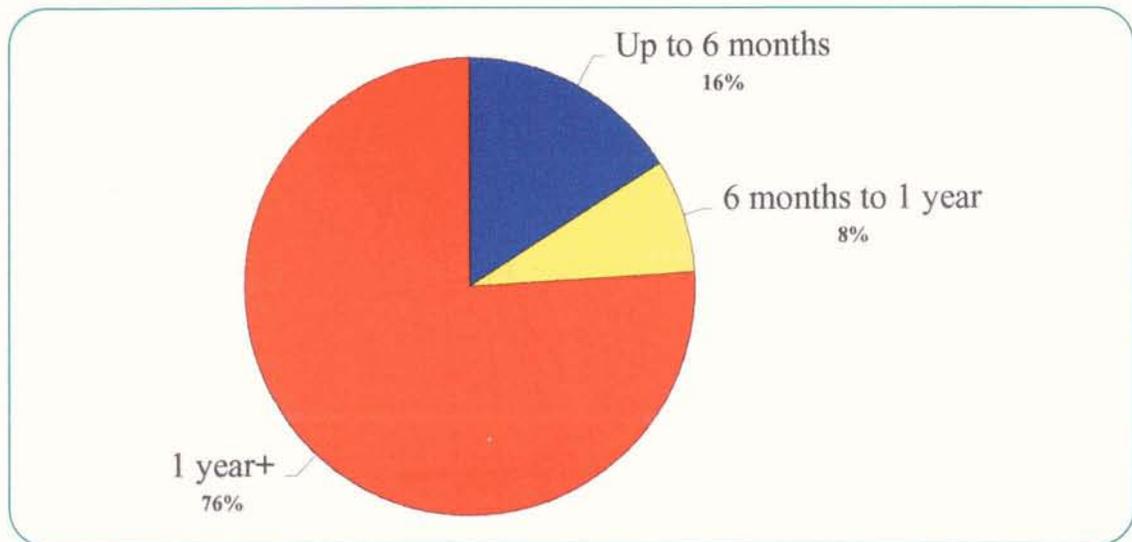


Figure 6 - Experience levels of injured workers

The higher percentage of experienced workers may reflect the composition of the workforce. Alternatively, it may reflect that experienced workers carry out tasks with a greater associated risk. Information on FIRS module attainment (Forest Industry Record of Skills) was absent from much of the information.

Type of injury

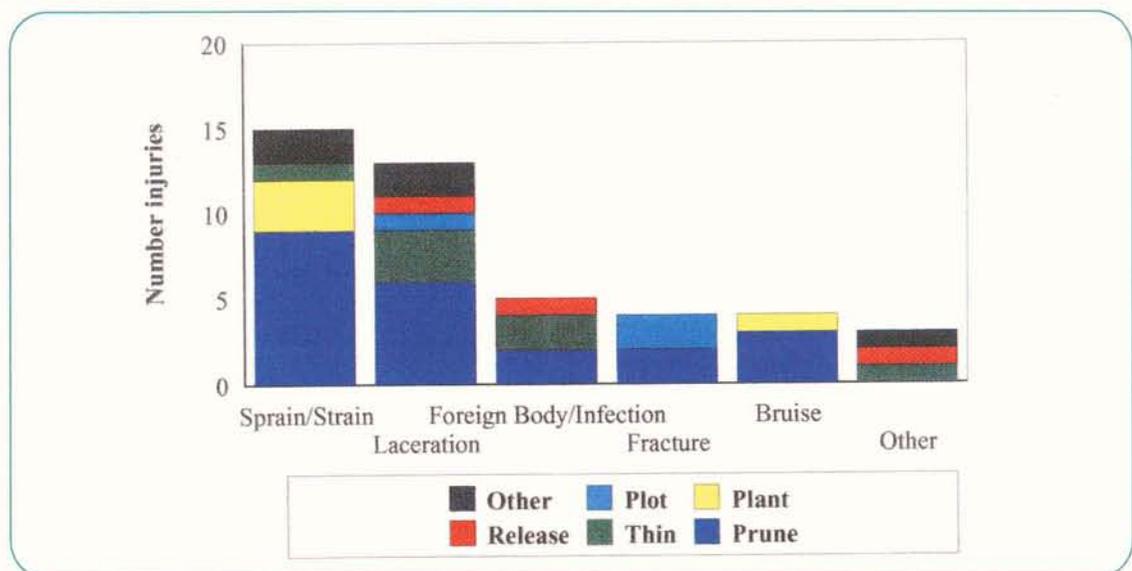


Figure 7 - Type of injury by operation

Sprain/strain type injuries were most common (35%), consistent with 1997 (37%) (Figure 7). Pruning recorded 60% of sprain/strain type injuries and 50% of lacerations. Four of the sprain/strain injuries occurred while walking between trees, and three were caused by slipping on the rungs of the ladder during ascent or descent.

Three of the pruning lacerations were the result of the ladder twisting, causing the blade of the pruners to come in contact with the pruner. Investigation into ladder design by Kirk (1999) showed a chain attached to the mid-point of the ladder can reduce ladder twist.

Five fractures to the wrist or ankle occurred in plotting and pruning operations. Four occurred as a result of falling over on the cutover, and one as the result of falling off a ladder. In this case, the worker had only been at the job a few days, and had positioned the ladder incorrectly with only one stile in the ground. At the third rung from the top, the ladder twisted and the worker fell, breaking his leg.

Injury - Part of body

The hand and fingers were the most commonly injured body part (11 injuries) (Figure 8), with five of these injuries occurring during pruning (Figure 9). Injuries to the ankle were also caused mainly during pruning, the result of slipping either when walking between trees, or ascending/descending the ladder. Wearing slip-resistant rubber soled boots and increasing the grip on ladder rungs would reduce these injuries.

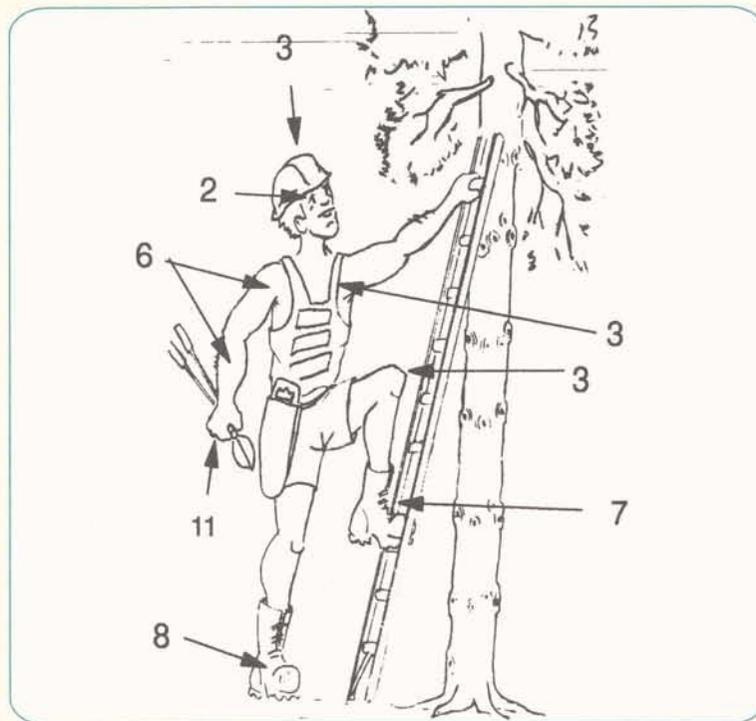


Figure 8 - Body part injured - 1998

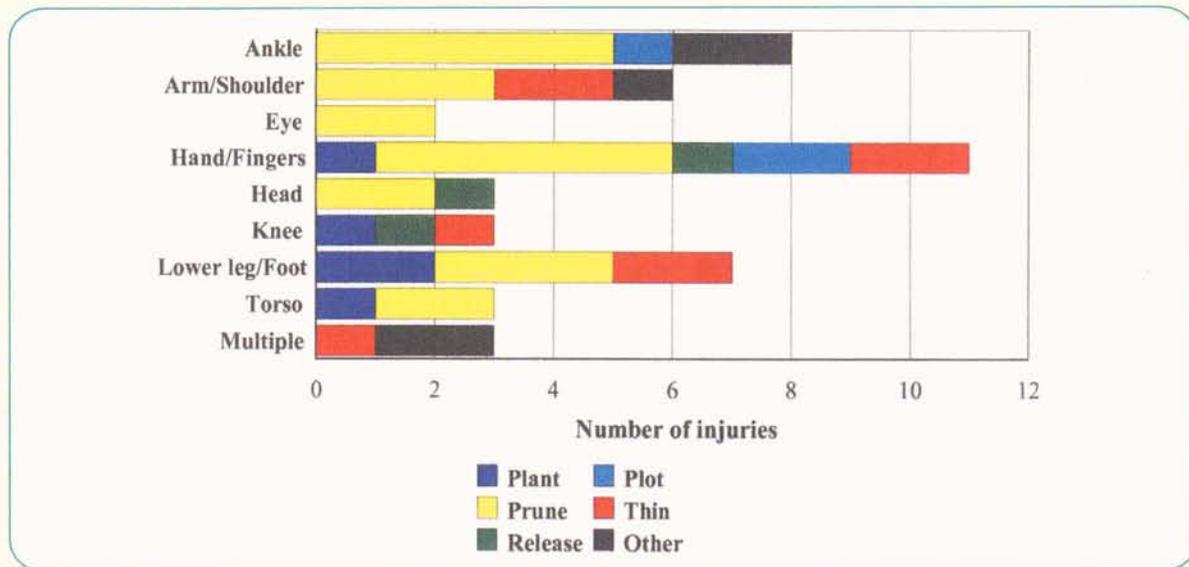


Figure 9 - Body part injured by operation

Injury - Operation

Pruning recorded the most injuries for 1998 and contributed to most lost work days (Table 2). However, higher severity was associated with plotting injuries.

Operation	No. of Injuries	Average Days Lost	Total Days Lost
Planting	5	7.8	39
Pruning	22	7.3	161
Thinning	8	7.1	57
Release spray	3	3.3	10
Plotting	3	21.6	65
Other	5	10.4	52

Table 2 - Lost time injuries by operation - 1998

Analysis of Minor Injuries (Less than one full day off work)

In 1998, 43 minor injuries were reported (56 in 1997). Most occurred in pruning (Table 3). Bruising accounted for 31% of all minor injuries (Figure 10).

Operation	Number of Minor Injuries
Pruning	16
Planting	7
Thinning	5
Nursery	2
Plotting	3
Release	2
Other (regen. pulling, weed control)	8

Table 3 - Minor injuries by operation

Type of injury

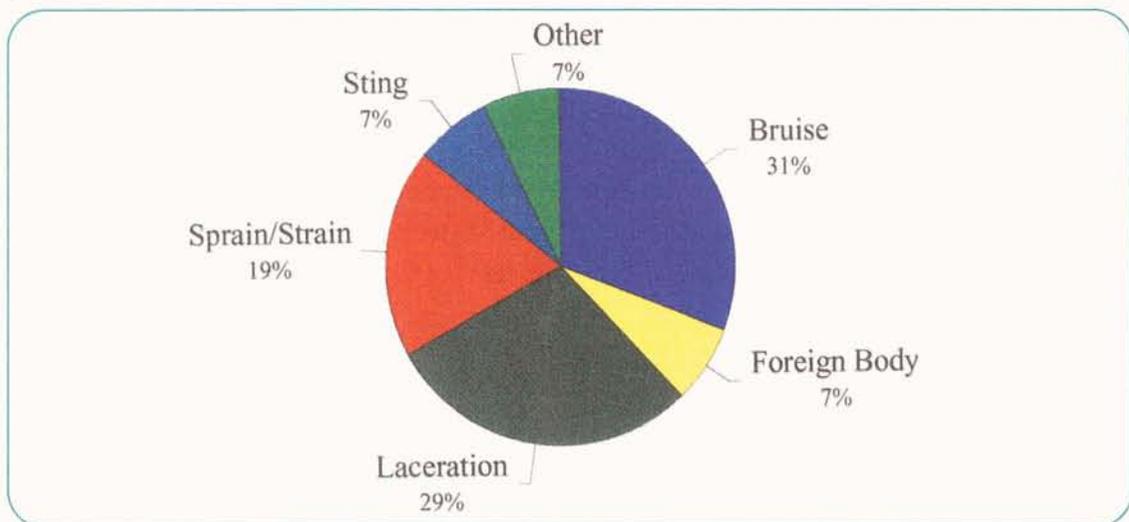


Figure 10 - Minor injuries by type

Experience

The mean experience reported for minor injuries was 4.9 years (median 3.1 years), ranging from one week to 18 years. This indicates that reported minor injuries were generally associated with more experienced workers, similar to the LTI finding.

Time of day

Minor injuries peaked between 8am and 10am, a different trend to that of both near miss and LTIs (Figure 11). Overall, more minor injuries were reported in the morning than afternoon. The drop around noon corresponds with meal breaks and fewer workers actually carrying out work.

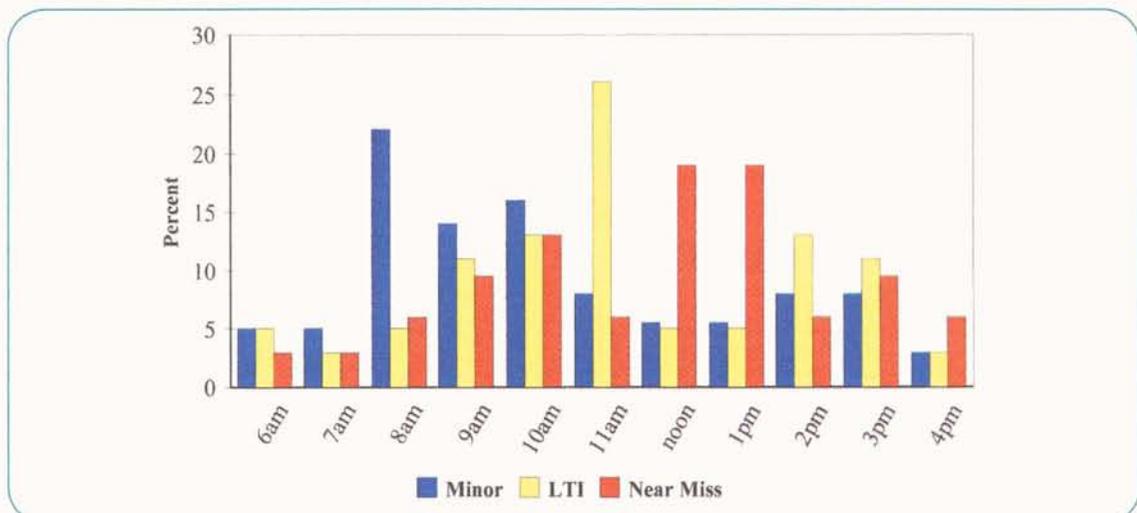


Figure 11 - Injury trend by time of day

Analysis of Near Miss Incidents

Operation	Number of Incidents	Percentage
Planting	15	36
Thinning	8	19
Travel	7	17
Pruning	3	7
Plotting	3	7
Release	2	5
Other	4	9
Total	42	100

Table 4 - Near miss incidents - 1998

Reporting levels remain consistent with 1997 (41 reported), the result of continued industry pressure to report near misses. Anonymous near miss reporting highlights an area where there is a high risk for injury, enabling management procedures to be implemented to eliminate, isolate or minimise the hazard.

Planting

Planting reported 36% of near misses (Table 4). Many of these reflected the hazardous nature of the terrain being worked on. The weather also had a part to play in near misses, with excessive wind currents causing sticks to hit the person planting.

Thinning

Carrying the added weight of a chainsaw, fuel and thinning gear when walking over rough forest terrain can increase the risk of slips and trips. Spiked boots have been shown to reduce the number of slips and falls (Kirk and Parker, 1992)

- Four thinning near misses were the result of slipping over with the saw
- Two occurred when thinning too close to another worker
- In another case, a tree was felled on to a sagging power line and pole
- A sailer fell and landed two metres from the worker

Travel

Fewer travel near misses were reported for 1998 (17 %) than for 1997 (45%). Travel near misses frequently involved another vehicle. This highlights the importance of adopting defensive driving techniques in the forest, especially where hazardous conditions exist such as freshly graded metal, blind corners, or dust.

Discussion and Conclusions

A total of 132 injuries and incidents were reported to the silviculture ARS for 1998; 35% of these were lost time injuries. The total number of work days lost was 359, compared to 294 in 1997. The average lost time per injury was 8.3 days, an increase on the 1997 (4.4) and 1996 (5.2) figures (Cummins, 1998, Byers and Parker, 1997). The increase in severity reflects the number of fractures

(four) reported to the scheme in 1998, each of which resulted in 30 or 60 days off work. Most (66%) injuries resulted in one to five days off work.

Injuries peaked in February (consistent with 1997). February is the first full month back at work after a holiday break, and is a time when the workforce faces hotter daily temperatures. Implementing a fatigue awareness programme at this time which includes information on body conditioning and dehydration, may prove beneficial in reducing the number of LTIs.

More experienced workers were injured this year, with 76% having worked at their job for more than a year (70% in 1997). In 1998, 16% of injured workers had less than six months experience; in 1997 this group accounted for 27% of injuries. With inexperience less of a factor, the impact of factors such as fatigue, increasing work pressure, and changing work patterns may have contributed to the increased rate of injury among experienced workers. Alternatively, experienced workers may be more associated with higher risk tasks.

Pruning continued to be the operation causing most (48%) lost time injuries, consistent with 1997 (43%) and 1996 (48%). Pruning injuries were mainly sprain/strain type or lacerations.

Reporting levels for near miss incidents remain consistent. Anonymous near miss reporting highlights potential injury areas, allowing interventions to be installed to reduce the likelihood of injury.

The continued success of the ARS is dependent on the support of the forest industry. A national database provides important benchmarking information to forest companies, and allows injury trends to be identified and targeted for injury prevention strategies and research. Injury information recorded at a national level can also show the impact of changes to work patterns in the industry.

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