

EYE PROTECTION REQUIREMENTS FOR SILVICULTURE

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Figure 1 - A selection of available eyewear

Summary

To determine the need for eye protection within silvicultural activities and to identify workers' attitudes toward protective eyewear, a survey form was distributed to 198 silvicultural employees working in forests throughout New Zealand. This survey was similar to an earlier national survey of loggers (Cummins, 1997a). The objective of this study was to identify the requirements for eye protection in silviculture, and to compare any differences in attitude between silviculture and logging. This will provide product specialists with a better knowledge of the silvicultural requirements for eye protection.

Conclusions

- Due to the timing of the survey (July-August), planting was the most common job being carried out.
- 78% of silvicultural workers felt there was some benefit to be gained from wearing eye protection, compared to 85% of loggers. Reduced injury was seen as the most important benefit by both silviculture (51%) and logging (58%) workers
- Overall, fewer silvicultural workers wore eye protection (31%), when compared to loggers (72%). Eye protection was worn by 65% of those who were thinning to waste, but neither pruners nor planters wore any form of eye protection.
- Fogging of lenses was the most common disadvantage with safety glasses for both silviculture and logging. Reduced vision in the rain was the main problem with visors for both groups.
- 87% of the surveyed silvicultural workers said they would wear some form of eye protection if it was better designed, compared with 94% of loggers.

- Nearly half (43%) of the surveyed silvicultural workers said they would pay \$30 or more for well designed eye protection.
- 88% of silvicultural workers had previously had an object enter their eye; 33% had sought medical attention resulting in an average eight days off per injury.
- Woodchips and sap were the most common objects to enter the eyes of silvicultural workers, compared with woodchips and dust for loggers.

Background

Silviculture traditionally encompasses a range of tasks which include pruning, planting, chemical spray releasing, thinning to waste, manual slasher releasing, removal of regenerating seedlings (regen. pulling), and mensuration. The increased range of tasks involved in silviculture increases the range of hazards encountered, and these hazards may be different from those generally encountered with logging activities. The potential for eye injury among silvicultural workers is increased by vegetative hindrance, as much of the work carried out in silviculture involves passage through thick or dense undergrowth and scrub.

While eye protection may become compulsory for harvesting crews working for the larger forest owners, the issue of eye protection in silviculture is still contentious. The variation between the range of working conditions encountered with each different silvicultural task makes a blanket eye protection policy inappropriate. Instead, any decision on the wearing of eye protection must be relative to the hazards and likelihood of injury associated with each task.

Method

A survey questionnaire was completed by 198 silvicultural workers in crews throughout New Zealand. The objective of the survey was to determine the attitudes of silvicultural workers to wearing eye protection, and to allow a comparison to be made with findings from an earlier survey of loggers (Cummins, 1997a). A survey form similar to the one previously conducted in logging crews was used.

Acknowledgments

Liro Limited would like to thank all forest company personnel and silvicultural contractors and their employees for their assistance and participation in the survey.

Results and Discussion

Length of time in silviculture

Most (52%) had been involved in silviculture for less than five years. This is consistent with findings from the New Zealand Forest Owners'

Association workforce census (Byers, 1995) which found the average time in silviculture was 4.2 years, and the Otago/Southland forestry workforce census (Byers and Adams, 1995), where 54% of the workforce had been in silviculture less than five years. In the East Coast silviculture workforce survey (Cummins and Byers, 1997), contractors had spent an average 10.2 years in silviculture, and crew members an average 4.8 years.

Job at time of survey

Due to the timing of the survey (July-August), planting was the task most commonly being carried out (Figure 2). Often a range of tasks were being carried out at the same time, such as planting and chemical releasing or planting and mensuration. This is typical of silviculture, where daily weather patterns influence the type of task able to be carried out. It also reflects management systems in the forest industry, where an assessment of quality is carried out in conjunction with the operation.

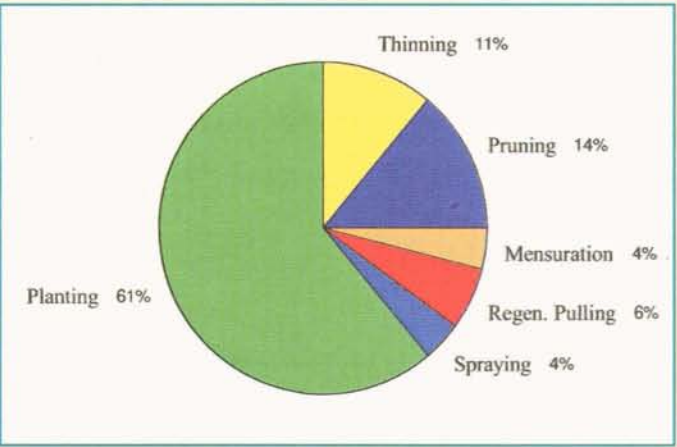


Figure 2 - Job at time of survey

Main benefits from wearing protective eyewear

It was encouraging to find that the attitudes of silvicultural workers toward wearing eye protection were similar to the attitudes of loggers. Seventy-eight percent of silvicultural workers felt there was some benefit to be gained from wearing eye protection, compared to 85% in the loggers' survey (Cummins, 1997a).

Reduced injury was seen as the most important benefit by both silviculture (51%) and logging (58%) workers. Reduced glare was a less important benefit to silvicultural workers (9%) than loggers

(12%), possibly because most silviculture work is carried out in young stands or on the cutover, rather than on bare skids.

Several respondents commented that wearing eye protection increased their level of confidence when pushing through undergrowth.

Protective eyewear worn - previously and currently

The Safety Code for Silviculture (OSH, 1991) states for pruning that suitable eye protection shall be supplied and worn by all workers *where necessary*. Where chainsaw pruning is carried out, it is recommended that a visor is attached to the helmet. Although there is an increased range of hazards encountered when thinning to waste, there are no specific requirements for eye protection in addition to those that exist for chainsaw use. Overall, fewer silvicultural workers currently wore eye protection (31%), when compared to loggers (72%). However, the statistics improve when separated by task. Of those who were thinning to waste, 65% currently wore some form of eye protection. In a similar finding to the logging survey, 10% of the workers who were thinning to waste considered sunglasses to be protective eyewear, which they are not. At the time of the survey, 100% of those who were either pruning or planting did not wear any form of eye protection.

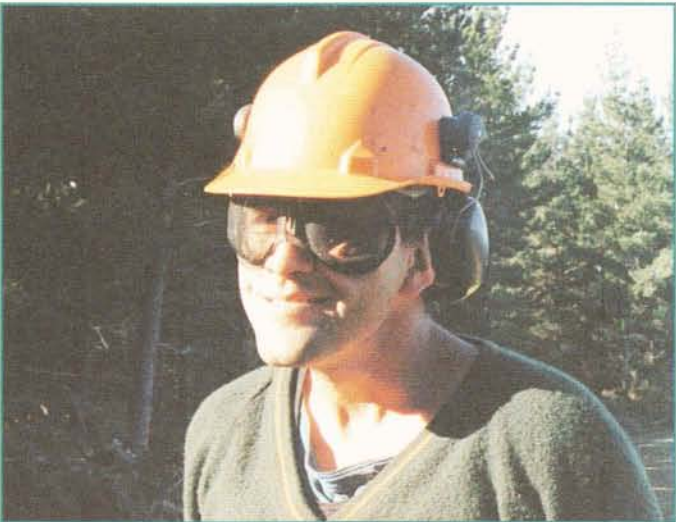


Figure 3 - Protective mesh goggles (Fly - eyes)

Main problems with safety glasses

Fogging of lenses was identified as the biggest problem with safety glasses, which is consistent with findings reported by loggers. Table 1 ranks the disadvantages identified with safety glasses from greatest (1) to least important (12).

Table 1 - Problems with safety glasses

1	Fogging of lenses
2	Reduced vision in the rain
3	Sweat running into the eyes from brow
4	Lenses scratch easily
5	Sap sticks to the lenses
6=	Reduced vision in direct sunlight
6=	Reduced vision in poor light conditions
7=	Hot to wear
7=	Reduced side vision
8	Poor fit
9	Interference with earmuffs
10	Irritation and headaches
11	Cumbersome
12	Low level of protection from large objects

These results are consistent with the findings from the survey of loggers, except sweat running into the eyes is perceived as a greater problem within silviculture than logging. In some silviculture tasks a helmet is not required to be worn, and workers would not benefit from the sweat absorption function of the sweat band in the helmet brim.

Main problems with visors

Reduced vision in the rain was identified by both silvicultural workers and loggers as the main problem with visors. Reduced vision in direct sunlight was the second most common problem with both groups. Obviously the different light and vegetative conditions encountered by each group does not have any impact on these problems. Table 2 ranks the common problems with visors from highest (1) to lowest (7) for both silviculture and logging.

The main difference between the two groups is in the area of design. This could be explained by the increased hindrance from undergrowth

and scrub encountered in silvicultural tasks such as thinning, which would catch on the visor more frequently. A visor which retracts into the helmet may have some application in this area.

Table 2 - Main problems with visors

Problems	Silviculture	Logging
Reduced vision in the rain	1	1
Reduced vision in direct sunlight	2	2
Reduced vision in poor light conditions	3	3
Poor design (catches on undergrowth etc)	4	6
Objects enter under visor and strike face	5	4
Hot under visor	6	5
Low level of protection from large objects	7	7

Would they wear better designed eye protection?

Before any investment is made into the improvement of eye protection, it is important to ascertain whether the industry would be more likely to wear an improved product. Survey results show that 87% of the silvicultural workers said they would wear some form of eye protection if it was better designed. This is an encouraging figure, and is similar to the 94% of loggers who said they would wear better designed eye protection.



Figure 4 - Helmet with retractable polycarbonate visor

Would you use a visor that was built into your helmet

Over half (61%) of the respondents were planting at the time of the survey, a task which does not normally require a helmet to be worn. However, 62% said they would use a helmet which had a retractable visor. The response may be based upon experience from a previous task carried out in silviculture, as it is common for the

one worker to carry out a range of silvicultural tasks throughout the year. Figure 3 shows a helmet with a built-in polycarbonate visor which slides up into the brim of the helmet when not in use. This type of design may have some application within the forest industry.

What would you pay for an improved product?

Nearly half (43%) of the surveyed silvicultural workers said they would pay \$30 or more for well designed eye protection. This is higher than the number of loggers (34%) who were prepared to pay this amount for eye protection. A similar number (42%) said they would pay between \$10 and \$30 to get something that worked well. Only 16% said they would pay between \$5 and \$10, indicating that workers are generally prepared to pay a reasonable amount to get a product that works. Many of the currently available forms of eye protection are priced within these ranges, and were discussed in the report "Protective Eyewear - What are the choices?" (Cummins, 1997b).

Importance of eye protection

To identify any difference in attitude between loggers and silvicultural workers, both groups were asked to comment on whether they believed eye protection was of concern. Results were consistent for both groups, with 85% of silvicultural workers and 81% of loggers believing eye protection was an important issue.

Eighty-eight percent of silvicultural workers (loggers 83%) had previously had an object enter their eye while working, for which 33% (loggers 28%) had sought medical attention. The average time off per injury was eight days (range one to 60), partially due to one severe thinning eye injury which required three months off work. However, the median was four days off, which is similar to the average of three days off per injury found for loggers.

Most suitable lens colour for job

Different light conditions in the forest will require different lens colours to either increase or reduce the amount of sunlight that enters the eyes. Figure 5 shows the preferred lens colour for the main tasks carried out at the time of the survey: pruning, planting and thinning. The combined response indicated a clear lens was preferred (50%), with yellow (32%) and dark (18%). This was an unexpected response from planters, as glare from the sun is a problem which could be remedied by a dark coloured lens.

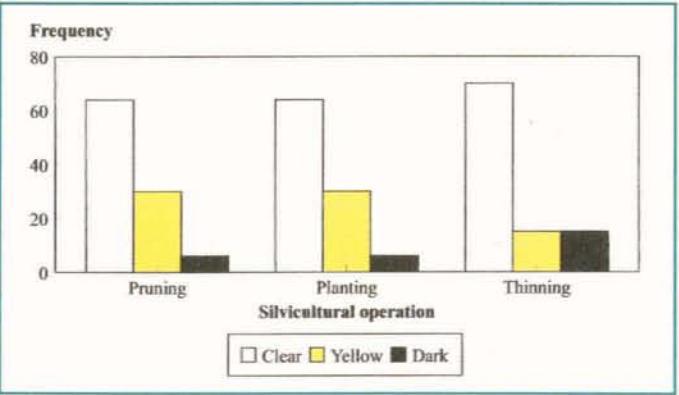


Figure 5 - Preferred lens colour by silvicultural operation

Most common objects to hit the eyes

Figure 6 identifies the most common objects to hit the eyes for all silvicultural jobs, while Figure 7 allows a comparison to be made between the silviculture tasks of pruning, planting and thinning.

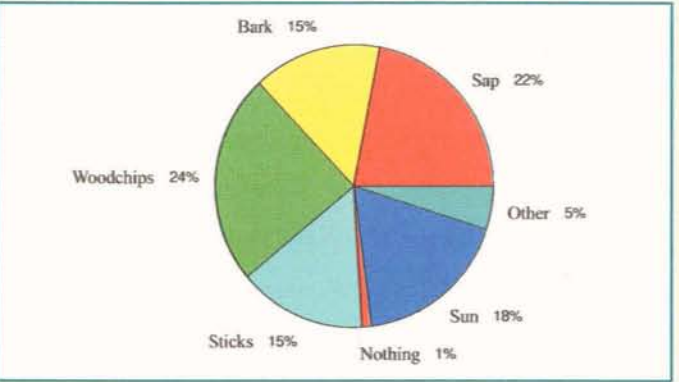
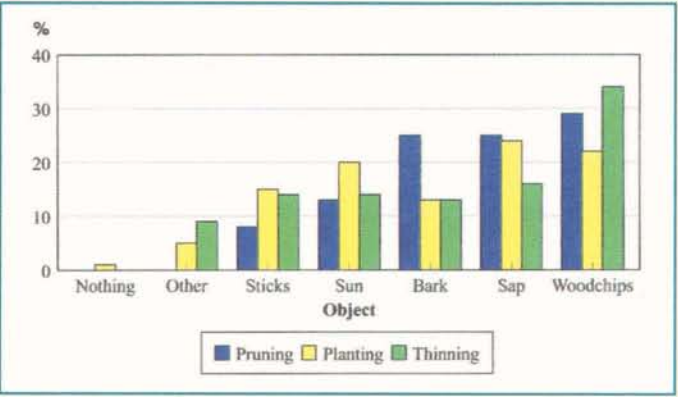


Figure 6 - Most common objects to hit eyes of silviculture workers over all tasks

These results show that sap entering the eyes is a problem for silvicultural workers, which was rarely reported by loggers. This is to be expected given that silvicultural operations are carried out in young stands. In the survey of loggers (Cummins, 1997a), the most common objects to enter the eyes were woodchips (41%), dust (35%), too much sun (16%), sticks (6%) and other objects (2%) (including bark, sap, dirt, undergrowth, mud).



*Other comprises Gorse and Blackberry

Figure 7 - Comparison of objects commonly hitting eyes by silvicultural task

Colour blindness and vision testing

The status of vision among forest workers has never been previously determined, although it has the potential to affect the quality and hazard awareness within the operation being carried out. The most common forms of colour blindness are an inability to perceive either red (Protanopia) or green (Deutanopia) colours. This may affect a person's ability to see paint signs or hi-visibility clothing in the forest. Three percent of surveyed silvicultural workers were aware that they were colour blind, and 11% did not know. Most (86%) said they were not colour blind.

An unexpectedly high number of silvicultural workers (77%) had previously had their vision tested. Testing of vision is one of several health tests which can be used to monitor the health status of forest workers at the start of working within the forest environment. Health monitoring is becoming increasingly important to contactors as part of the requirements of the Health and Safety in Employment Act (1992).

Conclusions

- The objective of the protective eyewear survey was to identify the requirements for eye protection in silviculture, and compare any differences in attitude between silvicultural and logging workers.
- Due to the timing of the survey (July-August), the most common job being carried out was planting. Often a range of tasks were carried out at the same time.
- 78% of silvicultural workers felt there was some benefit to be gained from wearing eye protection, compared to 85% of loggers. Reduced injury was seen as the most important benefit by both silvicultural (51%) and logging (58%) workers.
- Overall, fewer silvicultural workers wore eye protection (31%), when compared to loggers (72%). Eye protection was worn by 65% of those who were thinning to waste, but neither pruners nor planters wore any form of eye protection.
- For both silvicultural and logging workers, fogging of lenses was the most commonly identified problem with safety glasses; and for safety visors the most common problem was reduced vision in the rain.
- 87% of the surveyed silvicultural workers said they would be more likely to wear some form of eye protection voluntarily if it was better designed, compared with 94% of loggers. 64% would try a helmet fitted with a retractable visor.
- Nearly half (43%) of the surveyed silvicultural workers said they would pay \$30 or more for well designed eye protection, compared with 34% of loggers.
- 88% of silvicultural workers (83% loggers) had previously had an object enter their eye while working, for which 33% (28% loggers) had sought medical attention. The average time off per injury was eight days (range one to 60), compared with three days for loggers.

- A clear lens was preferred overall (50%), with yellow (32%) and dark (18%).

- Woodchips and sap were the most common objects to enter the eyes of silvicultural workers, compared with woodchips and dust for loggers.

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