

REPORT

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PROTECTIVE EYEWEAR - WHAT ARE THE CHOICES?

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Figure 1 - There are bandits in our forests!

Introduction

Between 1983 and 1996, the New Zealand forest industry Accident Reporting Scheme (ARS), administered by Liro Limited, recorded 175 eye injuries in New Zealand forests. Of these, 87% had occurred in logging. To reduce the incidence of eye injuries, various forms of protective eyewear are currently available. However, these are often viewed by forest workers as an unattractive option, offering protection at the compromise of comfort, visibility, and the ability to effectively carry out their job. Identifying the shortcomings of current eyewear designs is an important first step towards helping the manufacturers design styles suited to the harsh operating environment of the forest industry. This report outlines the results of field trials of various protective eyewear under forest conditions.



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Nationwide survey of loggers

A survey of 452 loggers working in New Zealand forests was undertaken to identify the attitudes of loggers towards eyewear protection (Cummins, 1997). The most encouraging finding of the survey was that an impressive 94% of the 452 loggers who completed the questionnaire said they would voluntarily wear eye protection if it was better designed. Identification of the required features of eye protection led to the selection and field trialling of a range of styles in co-operation with manufacturers and distributors.

Key findings from this survey were:

- 54% of loggers currently wore some form of protective eyewear
- The most common problem with safety glasses was fogging
- The most common problem with visors was reduced vision in the rain
- 83% of loggers had previously had an object in their eye
- 28% sought medical attention resulting in an average of 3 days off per injury

Requirements of eye protection

To encourage workers to wear protective eyewear, some or preferably all of the current design problems must be eliminated. Eyewear needs to be comfortable, fog-resistant, scratch-resistant, lightweight, not interfere with earmuffs and reduce glare. Equally important, it will have to look good.

Recent advances in lens technology have produced fog-resistant coatings which absorb moisture and reduce lens fogging. Hard-coated lenses reduce the incidence of scratching and with some styles manufacturers have produced a carry pouch to extend the life of the glasses.

Interchangeable lenses allow the user to select the best lens colour for the light conditions - clear for dull days, amber for low light, and dark for bright sunlight. The importance of the physical

appearance of protective eyewear has not been overlooked. Some frame designs are similar to popular sunglass styles; a factor recognised by most loggers who participated in the field trials.

An alternative to safety glasses for eye protection is to attach a visor to the helmet. These are often preferred by loggers for their improved ventilation and airflow. The survey results showed that while 11% of loggers currently wore safety glasses, more (43%) wore a visor (Cummins, 1997). However, there are still problems with glare and poor visibility in wet conditions. In addition, visors do not currently carry a safety standard.

Field Trial Results

Samples were provided by Strata Group (Uvex designs), Protector Safety (Bolle and Protector Safety designs), and Peltor (visor). All the samples selected for the trial met the initial requirements identified by loggers in the national survey. The preferred styles were the more fashionable designs.

Safety Glasses

Protector Safety 1 - Bolle "Bandit" (\$30 to \$40)

The Bandit (Figure 1) was the most popular. It incorporated a fashionable design, lightweight construction, ventilation and protection. Short, thin sidearms reduced earmuff interference, the incidence of headaches, and the design appeared to comfortably fit all faces. Most popular was a smoke (dark) lens, with a blue mirrored colour second. A result of the field trial is that an amber coloured lens is being developed for low light conditions.

Fogging was the main disadvantage with this style, but Bolle are now manufacturing a fog-resistant lens which should reduce this problem.

Protector Safety 2 - S/1982 (\$10 to \$20)

This design (Figure 2) has an elastic strap rather than sidearms, and has interchangeable lenses which are available in three colours (dark, amber and clear). Wearers commented that they did not experience

any problems with earmuff interference, blurred vision or headaches. They rated well for comfort, general fit and preventing objects entering the eyes, but could be improved by the addition of a padded strip across the brow. The preferred lens colour was amber, as it improved vision in low light conditions.

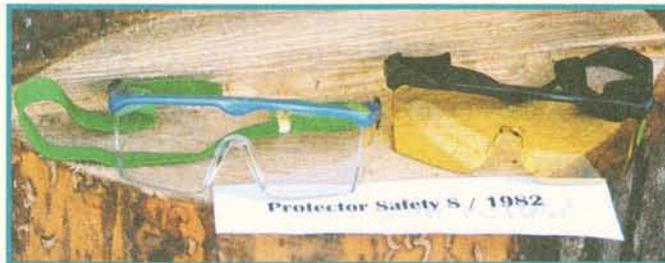


Figure 2 - Wearers liked the elastic strap of the S/1982

Strata Group 1 - Uvextreme (\$20 to \$35)

While this style (Figure 3) incorporates many features designed to improve fit and comfort, it appears that the addition of earmuffs reduces the effectiveness of these features. Wearers found that the continual pressure of the earmuffs on the sidearms led to pain in the mastoid bone (behind the ears), causing headaches. However, they performed well in preventing objects and dust entering the eyes.

Uvextreme are available with clear lenses which offer anti-fog properties and scratch resistance.



Figure 3 - The Uvextreme with adjustable frames and fog-resistance

Strata Group 2 - Uvex Astroflex with top dust cover - SE 9163-365 (\$20 to \$30)

This design (Figure 4) has similar features to the Uvextreme, with the addition of a flexible top dust cover. While the cover improved the comfort against the brow, there was a need for improved comfort around the ears, and some discomfort was noted with general fit. This style has an anti-fog coating which provides a moisture spreading action once the absorption capacity has been saturated.



Figure 4 - Added protection from a top dust cover

Strata Group 3 - Uvex SCT 400 (\$25 to \$35)

The main feature of this design (Figure 5) is the dark lens which offers optimum protection against UV light. Wearers liked the appearance of the multicoloured frames, and while they rated well for preventing objects entering the eyes, they were too dark to use in low light conditions.



Figure 5 - Improved UV protection from the SCT 400

Visor

Peltor have a new visor design which incorporates an extended peak, found by wearers to reduce the common problem of glare which normally occurs with visors. An improvement of the design was that springs from the hinge had been substituted by a catch mechanism. This eliminated an earlier problem of hinge springs popping out when catching on undergrowth.

Fogging of Lenses

Fogging and sweat running down from the brow was a problem even with the anti-fog coated lenses. A better understanding of the sweat absorption function of the fabric brow band in the helmet may reduce this problem. Raising awareness of the correct use of fog-resistant coatings may also help alleviate the problem of lens fogging.

Other Problems

Rainfall was a problem with all eye protection trialled, and one which is more difficult to remedy. Raindrops collecting on the outside of the glasses resulted in reduced vision, while rainfall collected in the mesh of the visor and created a film which was difficult to see through. Tapping the edge of the visor may be the simplest way to disperse water from the mesh of the visor.

Tree sap collecting on the outside of lenses was another problem found with all glasses. The tree sap collected on the outside of the lenses and reduced vision of the wearer. The continual requirement to stop work and clean the lenses interfered with productive time. Manufacturers are currently working to remedy this problem.

Improving fog-resistance

Several products are currently available to assist lens cleaning and improve fog-resistance. A towelette (Magic Ter-n-wipe) pre-moistened with isopropyl alcohol can be used for cleaning lenses and improving anti-fog properties. A gel stick (De-mist anti-fog stick) is also available. This can be applied over previously uncoated or coated lenses to assist fog-resistance and to increase the lifespan of the glasses.

Fog-resistance works by absorbing moisture. Once saturated, the coating needs to be ventilated to allow the absorbed water to evaporate. Removing the glasses from the face for a few seconds should be sufficient. Cleaning the glasses with anything other than a soft cloth may damage the fog-resistant coating thus reducing its lifespan. Looking after your glasses will prolong their life and maintain their properties.

The Future

Liro Limited is continually aiming to improve protective eyewear choices for forest workers. As new designs become available they will be field tested. Ideas are often sourced from those closest to the action - forest workers. If any reader has other options for eye protection, contact Liro Limited.

Suppliers of eye protection

Protector Safety Supply

Private Bag 31 900
Milford
Auckland
Phone 09-444 3443
Fax 09-444 7303

Bolle Bandit, S/1982, Peltor visor, anti-fog gel stick and wipes

Strata Group

Suppliers of Uvex products
PO Box 58-290
East Tamaki
Auckland
Phone 09-274 0729
Fax 09-274 1255

Uvextreme, Uvex Astroflex SE 9163-365, Uvex SCT 400

Uvex also produce a safety glass with the same moisture-spreading and anti-fog properties as the Astroflex, with the addition of an elastic backstrap rather than sidearms (Uvex HC-AF 4000). A further style with an elastic backstrap and hardened lens is the 9180-520 (\$24 to \$35).

NZ Safety Limited

Private Bag 92 100
Auckland
Phone 09 579 2880
Fax 09 579 8335

New innovations in eye protection are continually being developed. Two new anti-fog safety glass designs have recently been released through NZ Safety; the Nassau (\$16 + GST) and the Fectoid (\$18 + GST).

Contact the above for details of local supply outlets

Reference

Cummins, Tina (1997): Attitudes toward protective eyewear in the New Zealand logging industry 1997. Liro Report Vol 22 No 12 1997