REPORT

LOGGING INDUSTRY RESEARCH ASSOCIATION

NEW ZEALAND

ANALYSIS OF LOST TIME ACCIDENTS – 1985
(ACCIDENT REPORTING SCHEME STATISTICS)

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INTRODUCTION

At the recommendation of Swedfor AB Consulting (Swedfor, 1980), LIRA started a pilot Accident Reporting Scheme in 1981. Following a successful fifteen month trial period in the Bay of Plenty, the Scheme was extended to nationwide coverage at the beginning of 1983.

The Scheme is based on the voluntary completion of the required forms by loggers, contractors or companies who employ logging gangs. Details of information collected by the Scheme have been documented in three earlier publications (Prebble 1984, Gaskin 1986 A and B).

At the beginning of 1984, three additions were made to the information collected by the Scheme :

(1) The approximate time of day that the accident occurred.

(2) An indication of the years of experience an accident victim had had in the particular job they were doing when the accident took place.

(3) An estimate of the time lost due to the accident.

It took approximately one year for any consistency in data collection to appear. For example, in 1984, the first year of the collection of lost time data, of 271 forms describing lost time accidents only 71 (26%) indicated the number of days lost. In 1985 the corresponding proportion was 72.5%.

This Report analyses lost time accidents recorded during the 1985 calendar year.

Swedfor Consultancy AB, "Development of Safe Felling and Delimbing Techniques with Chainsaws", LIRA Project Report 14, 1980.

Prebble, R.L. "A Review of Logging Accidents in New Zealand", In Proceedings "Human Resources in Logging", LIRA 1984.

Gaskin, J.E. "Chainsaw Accidents to the Leg - 1983 to 1986", LIRA Report, Vol. 11 No. 7 1986.

Gaskin, J.E. "Protective Boots for Chainsaw Operators", LIRA Report, Vol. 11 No. 3 1986.

Table 1 - Accidents recorded by the Scheme for 1985

Fatal accidents	4
Lost time accidents	283
Minor accidents	70
Near miss accident	14
Total	371

(Note: Of the 283 lost time accidents recorded for the year, seven have been deleted from this analysis because they were vehicle accidents and not logging related. The total number of lost time accidents used in this analysis was 276).

ANALYSIS OF 1985 LOST TIME ACCIDENTS

The analysis is presented in seven sections :

Time of Day of Lost Time Accidents

The time of day has been divided into three periods - 7.00 a.m. to 10.00 a.m., 10.00 a.m. to 1.00 p.m. and 1.00 p.m. to 4.00 p.m. It is considered that these time slots best correspond to typical working days where there are two smoko breaks, at 10.00 a.m. and 1.00 p.m.

Table 2 - Time of Day of lost time accidents

Time of Accident	Number	% of Total
7.00 a.m. - 10.00 a.m.	86	31.2 %
10.00 a.m. - 1.00 p.m.	57	20.7 %
1.00 p.m. - 4.00 p.m.	55	19.9 %
Outside time range	2	00.7 %
Time not recorded	76	27.5 %
Total	276	100.0 %

A large proportion of the lost time accidents occur during the first break of the day. This time period is the longest uninterrupted work

period in the day. The first break probably also accounts for as much as 40% of the daily productivity, although this has not been formally established. A statistical test, the chi square test, was used to test the proportion of accidents during the first and second periods of the day. It confirmed that accidents in the first break were significantly higher than that of the second. It might be expected that more lost time accidents occur during the last period of the day where fatigue may influence the worker's reaction. However, the results do not support this.

Day of the Week of Lost Time Accidents

A trend towards more accidents during the early part of the week, as with the time of day, is apparent.

Table 3 - Lost time accidents by day of week

Day of Week	Number	Percent
Monday	68	24.6 %
Tuesday	73	26.4 %
Wednesday	43	15.6 %
Thursday	42	15.2 %
Friday	36	13.0 %
Saturday/Sunday	14	5.2 %
Total	276	100.0 %

When the mean of Monday and Tuesday was compared with the mean of the remaining three week days, a significant difference was found. (It has been suggested, tongue in cheek, that one way of reducing accidents would be to start the working week at 10.00 a.m. on Wednesday!) The data has highlighted this trend and the fact that extra care needs to be taken during these work periods.

Accident severity data for Monday and Tuesday versus the rest of the working week was compared. No significant difference in severity was found to exist.

Table 4 - Accident severity by part of week (in days lost)

Part of Week	Number*	Mean
Monday and Tuesday	82	14.6
Wednesday, Thursday and Friday	80	13.7

* Accidents where days lost were noted

Number of Lost Time Accidents by Type of Operation

The Scheme records four types of operations; clearfelling exotic, thinning exotic, native, and other.

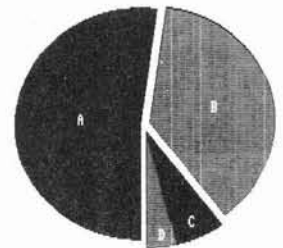| Group	Share
A Clearfell exotic	52.2%
B Thinning exotic	37.7%
C Other	6.2%
D Native	4.0%
Total	276

Figure 1 - Proportions of lost time accidents by type of operation

The proportions shown are consistent with numbers employed in the various sectors of the industry (Liley 1985). Comparison was made between the severity of accidents occurring in clearfell exotic versus thinning exotic. As shown in the following table, no difference shows.

Table 5 - Accident severity - clearfelling vs thinning* (days lost)

Type of Operation	Number**	Mean	Range
Clearfelling	90	14.8	1-99
Thinning	68	14.1	1-60

* All measurements are in days

** Number of observations do not correspond with data in Figure 1 due to missing information about the amount of time lost. This follows for all such analyses.

Although the range was much greater for clearfelling, the means of the two groups of data were similar.

Lost Time Accidents by Part of Operation

As Figure 2 indicates, four main groups of operations have been identified. The remaining five have been grouped together because the number of lost time accidents per group was small (less than twelve). Accident severity of each group was calculated.

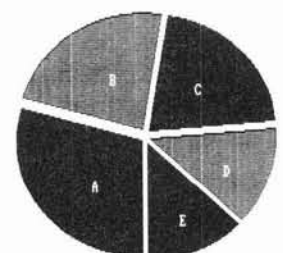| Group	Share
A Trimming	29.3%
B Skid work	23.2%
C Felling	21.0%
D Other	13.8%
E Breaking out	12.7%
Total	276

Figure 2 - Proportions of lost time accidents by part of operation

Liley, W.B. "A Survey of the Logging Industry - 1985", LIRA Report, Vol. 10 No. 12 1986.

No significant difference was found between trimming and skid work. However, there was a significant difference between trimming and felling (at the 95% level).

Table 6 sets out the severity of each of the four high risk parts of the operation. The number of observations do not correspond to the totals in Figure 2 due to missing information.

Table 6 - Severity by part of operation (days lost)

Part of Operation	Number	Mean
Felling	29	14.0
Trimming	48	12.3
Breaking out	27	12.6
Skid work	42	17.9

Due to the comparatively small size of each sample and the wide variation within each sample, there was no statistical difference between the four groups. Skid work would appear to have the highest severity, but more data is required before that can be verified. Fatal accidents have not been included in the analysis. In 1985, four such accidents were recorded by the Scheme; three in felling and one on the skids.

Type of Injury

Figure 3 presents four of the fifteen classifications of injury used in the Accident Reporting Scheme. As can be seen, these type of injuries represent the majority of injuries during the year.
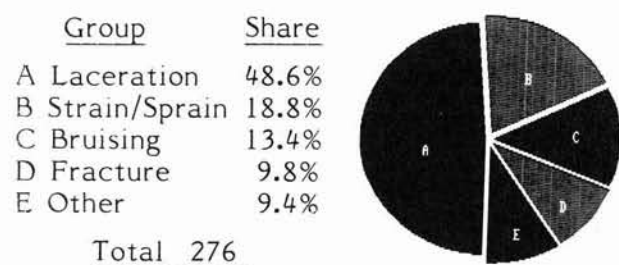
Group	Share
A Laceration	48.6%
B Strain/Sprain	18.8%
C Bruising	13.4%
D Fracture	9.8%
E Other	9.4%

Total 276

Figure 3 - Proportions of lost time accidents by type of injury

During the three years of the Scheme, chainsaws have consistently been responsible for some 40% to 45% of all accidents, hence the large number of accidents classed as lacerations. Differences in accident severity between the four types of injuries were as expected. Fractures were the most severe, followed by lacerations. Table 7 compares the severity of the four classifications of injury.

The relatively wide range of data means that the difference in severity between strains and bruising is not significant.
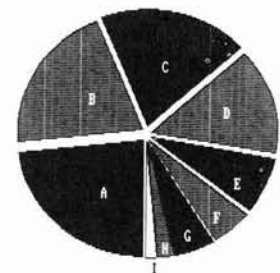
Table 7 - Severity of injury type (days lost)

Type of Injury	Number	Mean	Range
Lacerations	92	14.1	1-99
Strain/Sprain	33	7.0	1-22
Bruising	23	9.9	2-50
Fracture	18	34.8	4-99

Lost Time Accidents by Part of Body Affected

The Scheme records accidents by part of body affected in twelve classifications. Two groups have been omitted; multiple injuries and unknown.

Group	Share
A Leg	23.2%
B Torso	20.7%
C Hand	19.2%
D Foot	14.9%
E Arm	8.0%
F Other	5.4%
G Head	5.1%
H Eye	2.2%
I Neck	1.4%

Total 276

Figure 4 - Proportions of lost time accidents by part of body affected

As torso and leg injuries represent more than 75% of the total body area, it is not surprising that they accounted for more than half of lost time accidents. There was a high number of hand and foot injuries. Foot injuries have already been analysed in some detail (Gaskin 1986). The majority of hand injuries, 55%, were chainsaw related, and more than half of these were a direct result of chainsaw kickback. For the five most common parts of the body injured, accident severity was similar.

Table 8 - Severity by part of body injured (days lost)

Part of body	Number	Mean	Range
Leg	37	17.2	1-99
Torso	36	10.5	1-90
Hand	36	19.8	1-99
Foot	29	13.0	2-42
Arm	16	12.3	4-25

No statistical significance was found between any of the five groups, mainly due to insufficient data and the variability within the available data.

Gaskin, J.E. "Protective Boots for Chainsaw Operators", LIRA Report, Vol. 11 No. 3 1986.

Lost Time Accidents versus Years of Experience

Of the 276 lost time accidents, only 142 also recorded the experience of the victim. Given that low response, an interesting trend has emerged. The information collected was compared to data collected during a survey of the logging industry carried out in 1978/79 (Fielder 1979). During that survey, 120 loggers were interviewed and the amount of time each had spent in logging was noted. When the results from that survey are compared with data from the Accident Reporting Scheme, a remarkable similarity exists.

In comparing the differences between the two data groups using the chi-square test, no statistical difference was found. The similarity between proportions in the two sets of data would seem to indicate that there is not one level of experience more prone to accidents than any other. With the collection of further data through the Accident Reporting Scheme and the information from a major industry workforce survey currently being undertaken, this trend should be re-examined at a future stage.
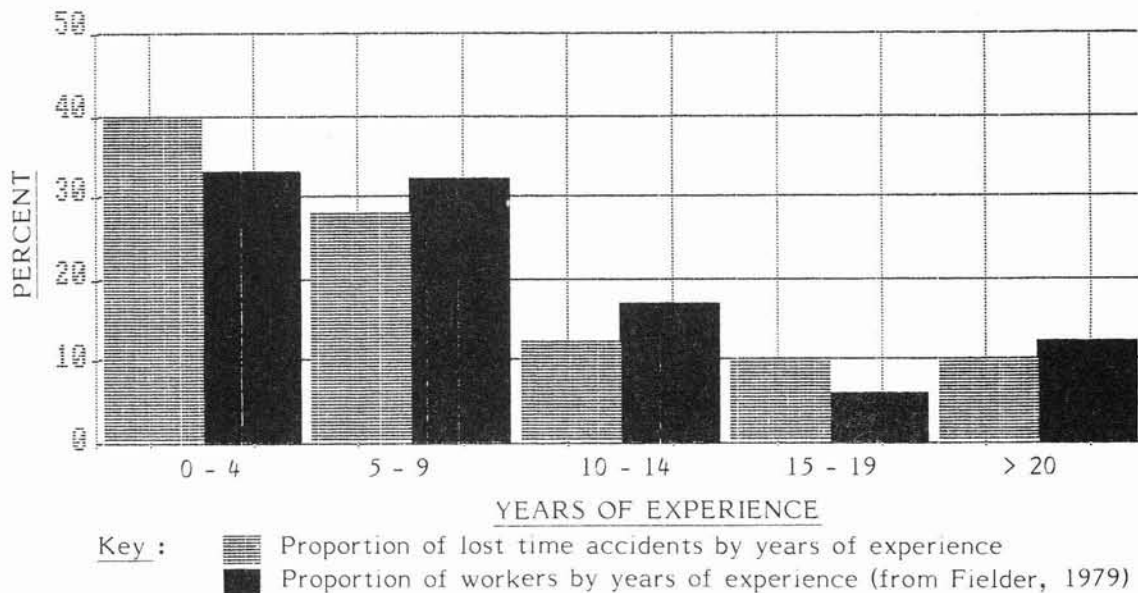

Key : ▤ Proportion of lost time accidents by years of experience
        ▧ Proportion of workers by years of experience (from Fielder, 1979)

Figure 5 - Proportion of lost time accidents versus years of experience

CONCLUSION

Due to the gaps in parts of the data, any results should be considered as indicative only. Also, we are unsure of the exact coverage of the Scheme. The coverage will be compared with data collected during the logging workforce survey currently in progress. Even with these limitations, some interesting trends have been highlighted through the analysis of lost time accidents from the 1985 statistics.

The distinct trend of more accidents occurring during the first one-third of the day and the first two days of the week suggests that extra care is needed at those times. It is difficult to attribute this trend to any specific factors. Some factors which may contribute to this trend include; weekend social life of loggers, and influence of sporting injuries from the weekend.

Furthermore, changes in management requirements such as cutting schedules for skiddies normally occur on a Monday.

Surprisingly, no significant difference could be found between severity of accidents by part of the week, type of operation, or part of operation. The mean days lost per accident was 14.5. The severity did not include fatal accidents which, had they been included, would have resulted in felling being the most dangerous part of the logging operation during 1985 (three felling fatalities recorded by the Scheme).

When number of accidents by years of experience was compared against the years of experience of loggers a similar distribution was noted. Again, both data bases are only samples of the logging force. However, the similarity is such that it will continue to be monitored over the next few years. It is anticipated that this analysis will be repeated annually.

Fielder, M. "Logging's Labour Force," LIRA Report, Vol. 4 No. 6 1979.