



ANALYSIS OF FATAL LOGGING ACCIDENTS 1988 TO 2005

Report prepared for:

Forest Industry Contractors Association
(FICA)

20 October 2006

by

Work/Smart
Forestry

Shane McMahon

Work Smart Forestry

10 Montgomery Cres.,

Putaruru 3411

Mobile: (021) 662 889

Home ph: (07) 883 8040

shane.mcmahon@actrix.co.nz

SUMMARY OF FINDINGS

- This report provides analysis of Department of Labour logging fatality data for the period 1988-2005. This analysis is similar in scope and content to an earlier LIRA report (Gaskin 1988: “Analysis of Fatal Logging Accidents”) covering the period 1968-1987. This earlier report also provided a benchmark to assess more recent fatal injuries statistics.
- The major findings were as follows:
 - Ninety-four (94) logging fatalities occurred over the period 1988-2005.
 - A drop in the annual number of fatalities is apparent after 1998 (average 6 fatalities pre’98 vs 3.7 fatalities post’98). This drop is coincidental with the initial release of the Approved Code of Practice for Safety and Health in Forest Operations.
 - The fatal injury rate (fatalities/1000 logging workers) decreased over the period 1988-2005. The average rate for the past seven years (’99-’05) was 0.94/1000 workers, compared to 1.9/1000 workers for the 1968-1987 period.
 - The number of fatalities per 1000 workers generally decreased with increased worker productivity.
 - The fatal injury rate (fatalities/Mm³) has decreased as annual harvest rates increased.
 - The average age of victims for the period 1988-2005 was 36 years old, compared to 32 years old for the period 1968-1987.
 - A breakdown of fatalities (’88-’05) showed felling (41%), breaking out (14%), extraction (12%) and skid work (10%) were the four most common tasks undertaken at the time of the fatal accident.
 - The most common cause of felling fatality (’88-’05) was working in front of hung up trees (28%). This was a similar result to that found for the ’68-’87 period.
 - The most common causes of breaking out fatalities (’88-’05) were being hit by stems during extraction (23%) and hit by rope during lineshifts (23%).
 - The eleven extraction fatalities involved the operator being thrown from the cab as a result of not wearing a seatbelt. All of these fatalities occurred prior to 1999.
 - The most common cause of skid work fatalities (’88-’05) was being hit by a moving machine (44%).

SOURCES OF DATA

- Logging fatality data was gathered from the Department of Labour Fatality Accident Register. Data used in this analysis related to commercial professional logging operations only. Fatality data was analysed on the basis of a July to June year (for instance July 2003 to June 2004 was reported as 2003 data). Note previous data reported by Gaskin was re-analysed and aligned with the July-June year.
- Employment and harvest volume data was sourced from MAF National Exotic Forest Descriptions and associated statistical reports. Attempts were made to gather employment numbers from Statistics NZ for the period 1988-1994 – however they were unable to provide data to the ANZSIC level required. The use of Official Yearbooks (as used by Gaskin) also failed to provide non-aggregated employment data.

FINDINGS

Number of Fatalities

- Ninety-four (94) logging fatalities occurred over the period 1988-2005.
- The long-term trend in annual logging fatalities since 1968 is shown on Figure 1.

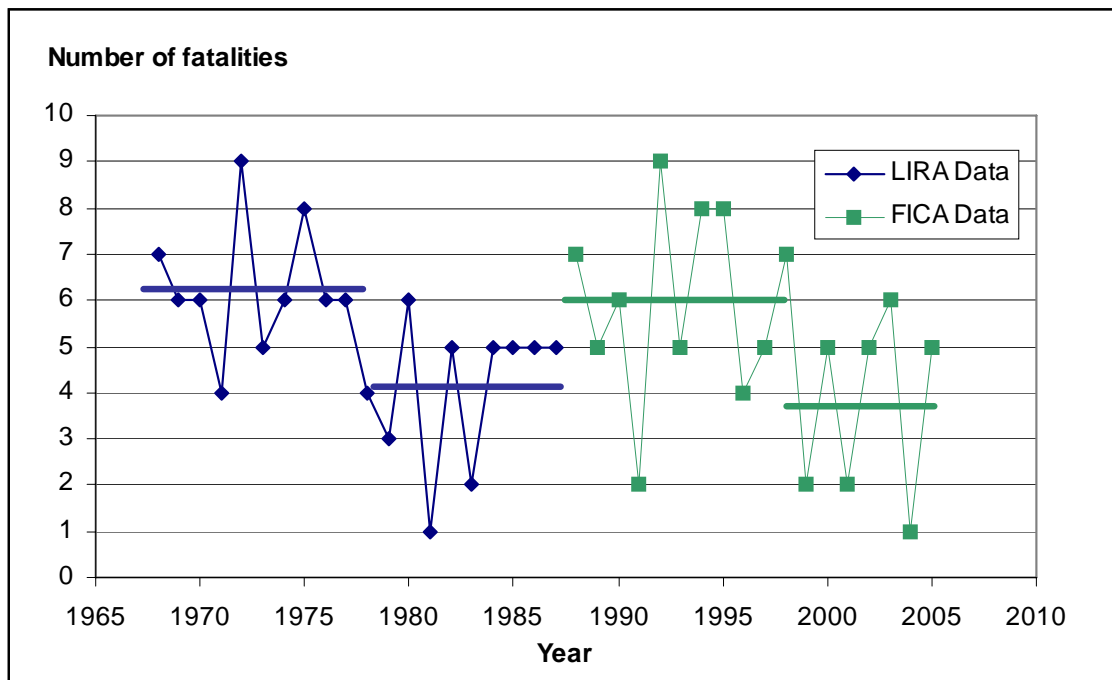


Figure 1 – Long-term annual logging fatality data

- Interpreting the FICA data showed:
 - There was a general decrease in the annual number of fatalities over the period 1988-2005. A drop in the number of fatalities is apparent after 1998 (average 6 pre'98 vs 3.7 post'98). This drop is coincidental with the initial release of the Approved Code of Practice for Safety and Health in Forest Operations.
 - The variation year-to-year is as great as the apparent decrease after 1998.
- Interpreting the combined datasets:
 - Gaskin found a similar decrease during his study, which he believed, was coincidental with adoption of formal training within across the industry.
 - Despite the decrease in the late 1970's, fatality numbers subsequently increased over '80's and early '90s.

Fatalities and the Workforce

- The total number of workers employed in logging will influence the fatality statistics – for a given risk, the larger the workforce the greater the exposure to fatal situations.
- Over the period 1994-2005, annual logging employment (ANSIC Code 030200) ranged between 3600 and 4200 (Figure 2). This compared with 2500-3100 for the 1968-1987 period.

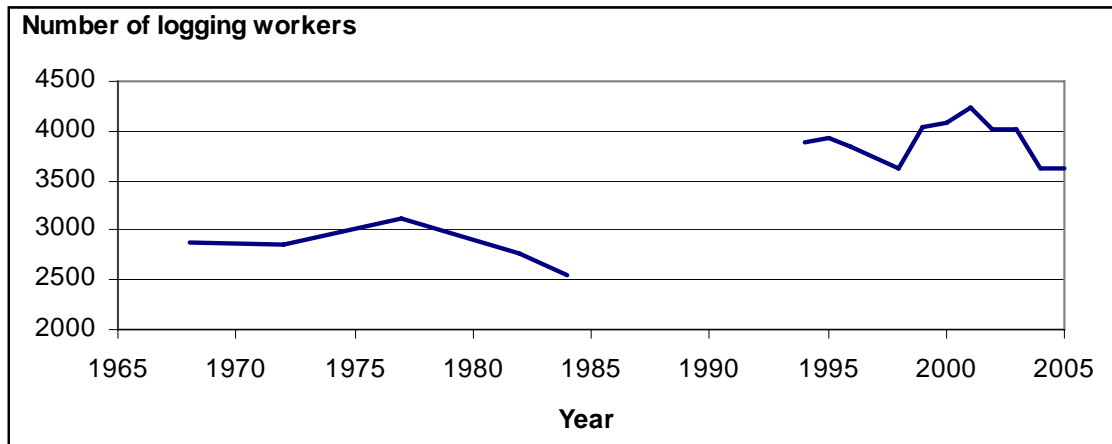


Figure 2 – Logging employment data

- To account for employment numbers, the ratio of annual fatalities to annual employed was determined (Figure 3).

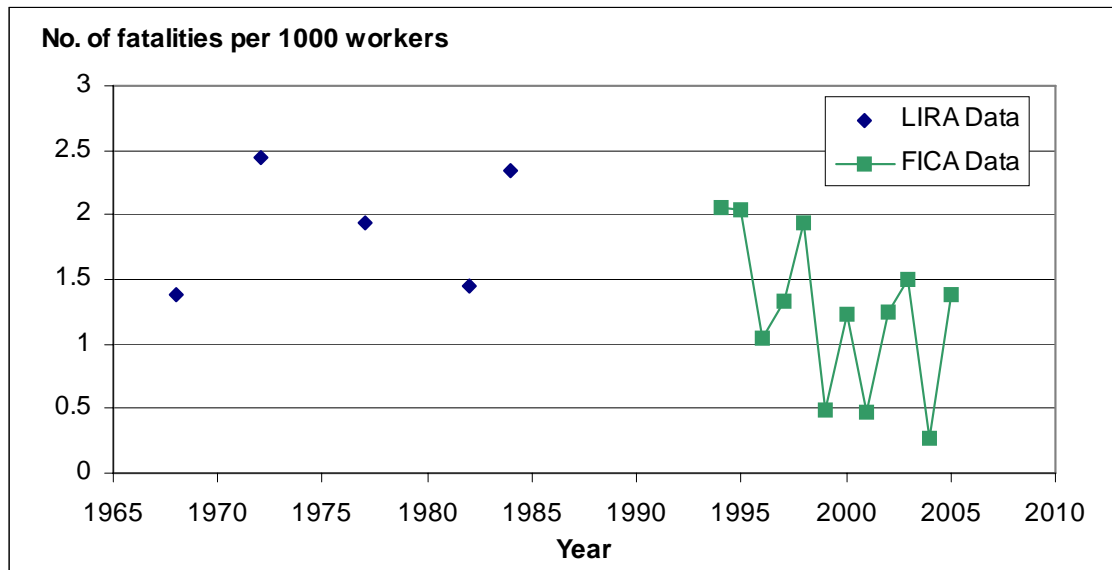


Figure 3 – Fatalities per 1000 logging workers

- The fatal injury rate (/1000 workers) decreased over the period 1994-2005.
- The average rate for the last seven years (post 1999) was 0.94/1000 workers. The average rate from the earlier LIRA data for the period 1968-1987 was 1.9/1000 workers.
- Given the increase in logging workers between the LIRA and FICA studies, the reduction in injury rate implies a reduction in risk to workers over the combined periods.

Productivity

- Gaskin stated that lower productivity in indigenous logging operations partially explained the fatality rate being 3 times higher than for exotic logging operations. Although not stated, this was likely to imply that productivity reflected logging difficulty and risk.
- To further investigate this relationship, the effect of productivity on a fatal injury rate (fatalities/1000 workers) was investigated on the combined (exotic) datasets (Figure 4).

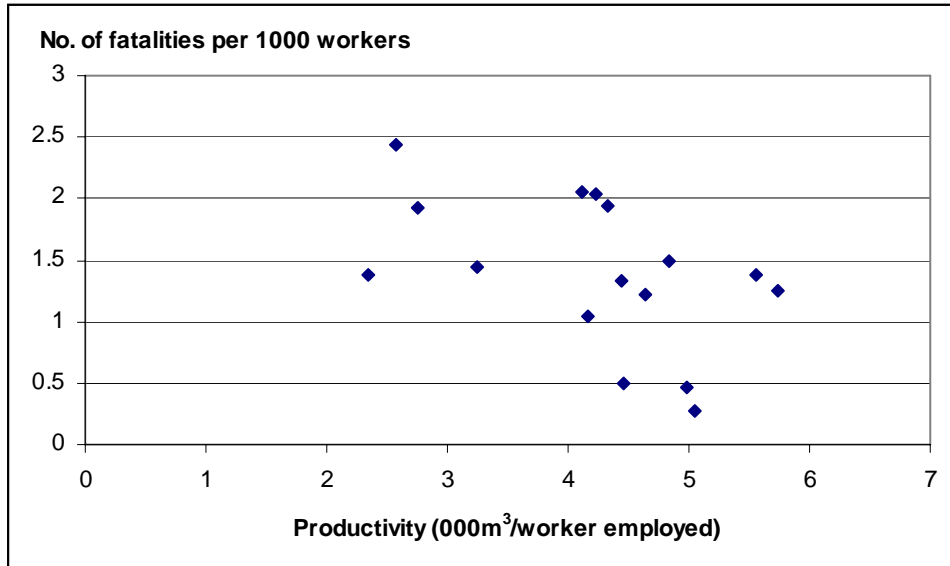


Figure 4 – Effect of productivity on fatal injury rate

- The number of fatalities per 1000 logging workers generally decreased with increasing productivity (000m³/employed worker). This implies that technological and operational improvements have positively impacted on fatal injury rate.

Fatalities and Harvest Volumes

- Annual harvest volumes have increased steadily since 1968 (Figure 5).

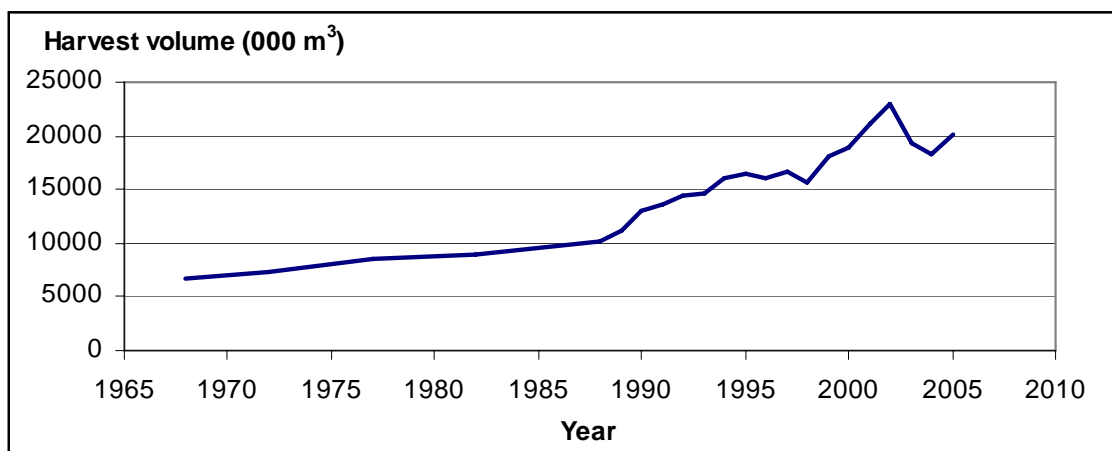


Figure 5 – Long-term annual harvest volumes

- The fatal injury rate (fatalities/Mm³ harvested) has decreased as the annual harvest volumes have increased (Figure 6).

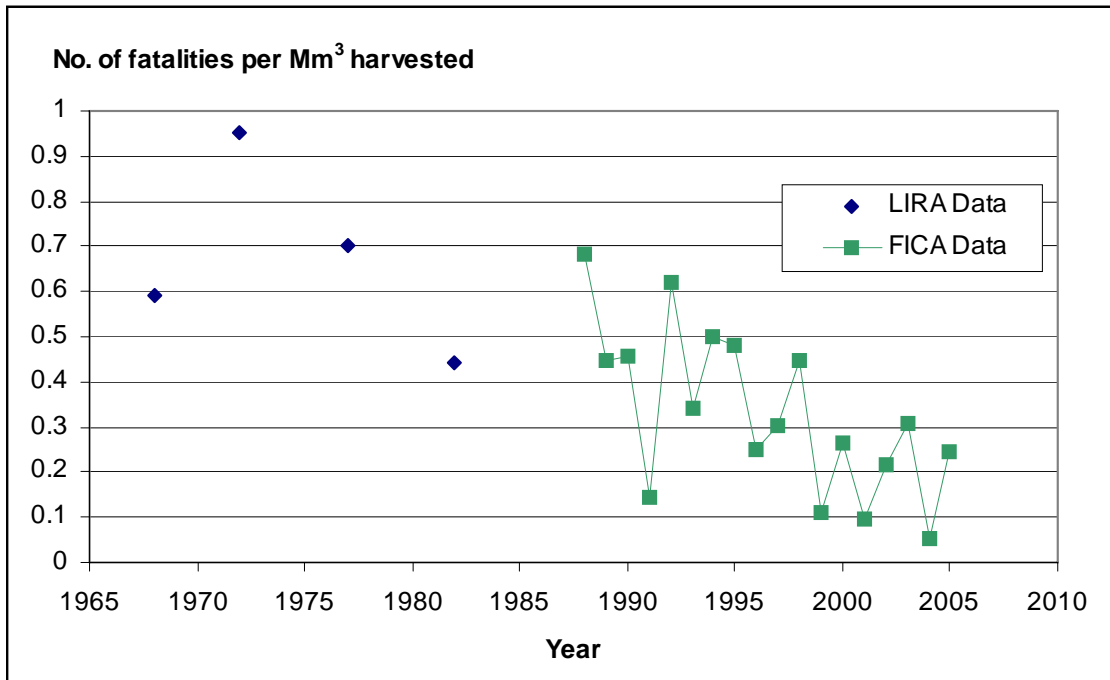


Figure 6 – Long-term annual logging fatality data

Victim Age

- The average victim age for the period 1988-2005 was 36 year old.
- Gaskin (1988) found an average age of 32 years old for the period 1968-1987.
- Comparing the LIRA and FICA datasets shows a decrease in fatalities of workers < 20-30 years old with a corresponding increase in the 31-50 age group (Figure 7).

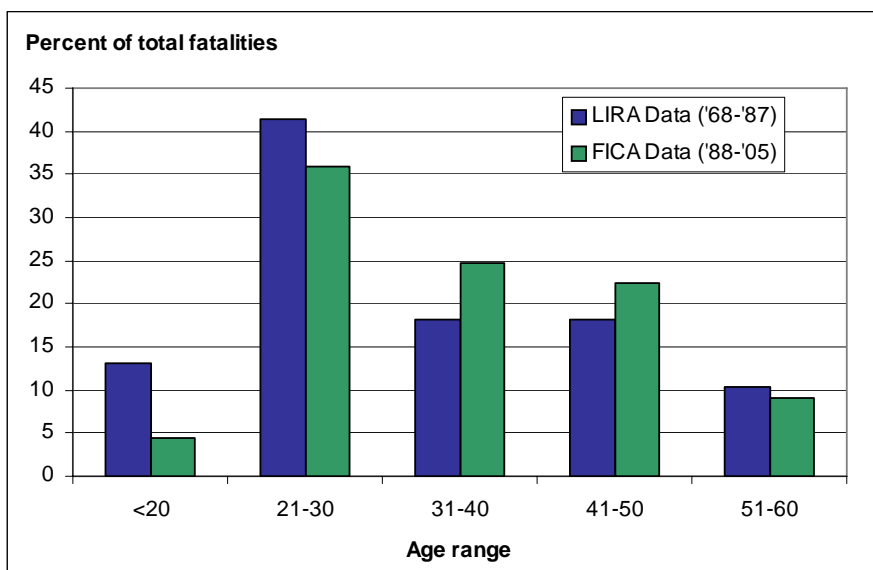


Figure 7 – Victim age comparison

Job at Time of Accident and Cause

- All fatalities (94) were classified according to the job being undertaken at the time of the accident (Table 1). Where possible, categories were the same as used by Gaskin.

Table 1 – Job at time of accident

Operation	Number	Percentage
Felling	39	41%
Breaking out	13	14%
Extraction	11	12%
Skid work	9	10%
Trimming	5	5%
Maintenance	5	5%
Road use	5	5%
Moving Plant	2	2%
Loading	3	3%
Helicopter op	1	1%
Unknown	1	1%

- In relation to the earlier LIRA data:
 - Felling remained the most high risk activity, although the proportion dropped 14%
 - Extraction fatalities increased 5%
 - Skid work fatalities increased by 4%
 - Breaking-out fatalities increased 4%
- Where possible, the cause (or circumstances) of the fatalities was determined from the DOL fatal accident register.

Causes of Felling Fatalities

- The breakdown of felling fatalities is shown in Table 2. Note a significant proportion of fatality entries in the DOL Register lacked adequate information to accurately classify the cause.

Table 2 – Causes of felling fatalities

Cause	Number	Percentage
Hang up / working in front of cut up tree	11	28%
Direction/Position (Description unclear)	9	23%
Hit by contacted tree/spar	5	13%
Retreat to incorrect position	4	10%
Hit by sailer	3	8%
Fell direction not anticipated	3	8%
Hit by tree felled by second party	2	5%
Driving tree	1	2%
	39	

- Fatalities related to hang-ups remain the most common at 28%. In the LIRA report, Gaskin reported that working in front of hangs ups accounted for 33% of fatalities.
- Note there have been five felling fatalities between January and October 2006.

Causes of Breaking Out Fatalities

- The breakdown of breaking out fatalities (13) is shown in Table 3.

Table 3 – Causes of breaking out fatalities

Cause	Number	Percentage
Hit by stem during extraction	3	23%
Hit by rope during lineshift	3	23%
Crushed by skidder	2	15%
Hit by stem during hook-on	1	8%
Flying debris	1	8%
Crushed by tailhold	1	8%
Falling weight	1	8%
Rock	1	8%

Causes of Extraction Fatalities

- The eleven extraction fatalities involved the operator being thrown from the cab as a result of not wearing a seatbelt. All of these fatalities occurred prior to 1999.

Causes of Skid Work Fatalities

- The breakdown of skid work fatalities (9) is shown in Table 4.

Table 4 – Causes of skid work fatalities

Cause	Number	Percentage
Hit by machine	4	44%
Hit by felled stem/log	2	22%
Hit by stem from chute	1	11%
Rolling log	1	11%
Falling tree (windblow) from edge of skid	1	11%

Causes of Trimming Fatalities

- The breakdown of trimming fatalities (5) is shown in Table 5.

Table 5 – Causes of trimming fatalities

Cause	Number	Percentage
Rolling stem being trimmed	2	40%
Previously trimmed stem	2	40%
Hit by rootball	1	20%