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# Sawmill Accident Register Records – Main Findings of a Survey from 37 Mills

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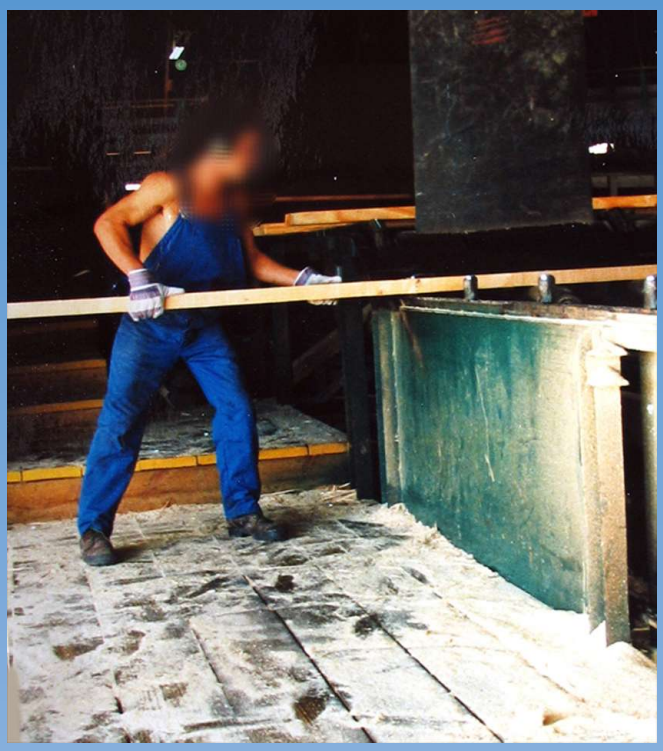
## Summary

In 2001 COHFE began researching Musculoskeletal Disorders (MSD) in sawmills with the aims of:

- determining the prevalence of musculoskeletal problems amongst sawmill workers,
- identifying high-risk sawmill tasks, and then
- designing and evaluating measures to prevent or alleviate musculoskeletal problems in these tasks.

Twelve months of Accident Register Records from 37 mills were collected and analysed to get broad indicators of problematic tasks within the industry. Timber handling activities associated with tables, filleting, and sawyers were highlighted for more detailed studies. This report outlines the steps involved in this survey and summarises the main findings from it.



## Introduction

The sawmilling industry[1] is known to have a high level of manual handling, with tasks often involving high loads/forces, awkward postures, and repetitive movements; some of the key risk factors for MSDs. To learn more about MSD injuries, information on the incidence, severity and origin of sawmill injuries was sought both locally and internationally. However, while there was some general anecdotal information on MSDs from within the industry, only limited archival information emerged on the specific nature or extent of these problems.

A report by ACC analysed claims data for the Forestry and Logging, and Log Sawmilling and Wood Product Manufacturing sectors for the period 1994/1995 to 1998/1999 (Laurs, 2000). This identified that Log Sawmilling and Timber Resawing and Dressing represented 50% of all new injury claims (42% and 8% respectively), despite only being 41% of the total workforce for all industry sectors included in the ACC report (MAF, 2001). Other sectors had significantly lower proportions of new injury claims (e.g. pulp, paper and paperboard 10%, plywood and veneer 8%). At least 6500 new claims occurred during the four year period of the review, equating to approximately 3250 new injury claims for Log Sawmilling and Timber Resawing and Dressing.

[1]To be consistent with industry classifications, in this study Sawmilling refers to the work activities involved in Log Sawmilling and Timber Resawing and Dressing (ANZSIC categories C231100 & C231300), unless specified otherwise.

Log sawmilling was also responsible for 39% of claims cost within the period surveyed. Soft tissue injuries (sprain, strain, internal organ) made up 51 percent of the new injuries, with 14 percent laceration, puncture wound or sting, and 7 percent gradual process in nature. A total of at least 17 percent of new claims were reported to be back injuries.

The two primary causes of injury stated are 'work property or characteristics' (more than one third of the reported injuries), and 'lifting/carrying/strain' (around one sixth of the injuries).

While this data provided a useful overview of injuries in the wood processing sector, it did not identify specific tasks or work areas engaged in at the time of injury, or additional injury details such as body part/s affected. The intention of conducting a survey of Accident Register records from a sample of sawmills was that it would provide, at least initially, some direction for research in this area.

It was determined that an exercise of gathering and compiling more detailed existing company-held information on injuries was necessary. Accident Registers have been held in every workplace as a requirement of law since 1992, and share similar characteristics in their design as a result. COHFE staff had previous experience of completing a survey of Accident Register data in another New Zealand industry and knew that despite inevitable variations in data coding and detail, this was a workable method of gaining a snapshot of MSD injury data from the industry. This information would identify the sawmill tasks, work areas, and body parts being mentioned most frequently in Accident Register reports.

# Accident Register Survey Methodology

## Aims:

1. To identify which sawmilling tasks are most frequently linked to the reported injuries, as well as the nature of these injuries.
2. To identify which sawmilling tasks health & safety staff in these mills see as those most likely to be linked to injury.

A list of New Zealand sawmills producing greater than 5000 $m^3$ per annum was compiled from MAF and other industry data. MAF were only able to provide contact details of those mills that had given prior approval for data to be passed on in this way. The list was then broken down into 'small' mills - producing between 5,000 and 9,999 m3 (sawn timber per annum), 'medium' mills – producing between 10,000 and 19,999 $m^3$, and 'large' mills - producing more than 20,000 $m^3$.

A desire to involve a large percentage of sawmill staff within the resources available was achieved by targeting mostly larger mills. However, some small and medium mills were also targeted in order that there was a good geographical spread throughout the country, and on the assumption that manual handling activities may be higher in small-medium mills with less mechanisation.

A total of 53 sawmills were contacted in the survey, comprising 10 small mills (representing 147 staff), 10 medium mills (representing 468 staff), and 33 large mills (representing approximately 2800 staff). The number of staff employed by these 53 sawmills represented approximately 40% of the Sawmilling workforce.

Following telephone contact with these 53 mills, a total of 50 agreed to participate in the survey. For each sawmill, the person responsible for health and safety within the mill was sent a covering letter, along with:

- A form for recording injury date, department, job title, task, injury type, and body part affected, for (all) injuries occurring between 1 September 2000 to 31 August 2001.
- A form for recording their 'best guesses' for the 'top five' tasks which in their opinion were most likely to cause MSDs in sawmills; detailing the department, job title, task and their reasons why.

# Results

Of the 50 mills that were sent forms, 37 (74%) returned Accident Register data for the 12 month period. Using the same MAF categories, the breakdown by mill production volume was: 9 small mills, 5 medium mills, and 23 large mills. Based on 2000 production data these mills represent approximately 26% of the New Zealand sawmill workforce and 45% of the production volume (MAF, 2001). 33 of these mills (66%) also completed the 'Best Guesses' form.

## Accident Register Data Summary

The total number of musculoskeletal injuries reported from the 37 mills that returned data for the twelve month period (1 September 2000 to 31 August 2001) was 505.

The data provided by different sawmills varied in a number of ways which affected the way that the data could be summarised. The main differences were in:

- The reporting systems used (some used the forms sent to them, others sent data in their own system format).
- Terminology for job titles and task descriptions.
- The level of detail provided for each entry.

To help improve consistency and enable better data comparison, job titles were defined and grouped as follows (based on the job title and task information present in the data):

- Tablehand
- Yardhand
- Grader
- Maintenance
- Saw doctor
- Sawyer
- Driver
- Millhand

(Millhand used where the job title or task information given was unclear. Included: bin sorter operators, planer mill, strapping of packets, timber sorting, undefined lifting and handling activities, tagging, debarker, kiln operations, quality control, and injuries that occurred when employees walking or moving along walkways or other unspecified work areas).

It is important to reiterate that this data, while meeting the intended study aims, provides simple totals and that incident and severity rates could not be determined as total working hours and time lost were not known. The two main analyses were of MSD injuries by job title and MSD injuries by body area.

Table 1. MSD injuries by job title

| Job title | Number of MSD injuries reported | Percentage of total MSD injuries |
|---|---|---|
| Millhand | 152 | 30 |
| Tablehand | 131 | 26 |
| Sawyer | 115 | 23 |
| Maintenance | 35 | 7 |
| Yardhand | 28 | 5 |
| Grader | 15 | 3 |
| Saw Doctor | 16 | 3 |
| Driver | 13 | 3 |
| TOTAL | **505** | **100** |

The significant point to note from this table is that over half the number of MSD injuries are associated with tasks commonly involving timber handling (Tablehands, Yardhands, Graders, the majority of Millhands, and some Sawyers).

From the raw data, timber handling is specifically mentioned in the task descriptions of 303 cases (165 for table-related tasks, 109 for saw-related tasks, 29 for filleting tasks). The only other significant factor mentioned is 56 injury cases in which the injury description stated that a slip, trip or fall occurred. These appeared to occur evenly throughout the task descriptions.

Table 2. MSD Injuries by Body Area

| Body area affected | Number. of Reported Injuries | % | Specific Body Area Affected | Number. of Reported Injuries | % |
|---|---|---|---|---|---|
| Neck and head | 33 | 6.5 | Neck<br>Head | 26<br>7 | 5.1<br>1.4 |
| Back and low back | 187 | 37 | Back<br>Low back | 134<br>53 | 26.5<br>10.3 |
| Abdomen and chest | 9 | 1.8 | Abdomen<br>Chest | 4<br>5 | 0.8<br>1.0 |
| Shoulder<br>Arm | 50<br>52 | 9.9<br>10.3 | Shoulder<br>Arm<br>Elbow | 50<br>36<br>16 | 9.9<br>7.2<br>3.2 |
| Wrist and hand | 77 | 15.2 | Wrist<br>Hand | 48<br>29 | 9.5<br>5.7 |
| Hip<br>Leg | 4<br>43 | 0.8<br>8.5 | Hip<br>Leg | 4<br>10 | 0.8<br>2.0 |
| Ankle and foot | 47 | 9.3 | Knee<br>Ankle<br>Foot | 33<br>41<br>6 | 6.5<br>8.1<br>1.2 |
| Unknown | 3 | 0.6 | Unknown | 3 | 0.6 |
| **TOTAL** | **505** | **100** | | **505** | **100** |

Back injuries accounted for 37%, including low back injuries at 10.3%. Wrist and hand injuries were also prevalent at 15.2%, arm injuries at 10.3%, shoulder injuries at 9.9%. When added together, upper limb injuries become more prominent at over 35%. This pattern of injury location is relatively consistent with most industries where manual handling is present, as the upper limb and trunk are the body areas most commonly involved in these tasks.

Table 3. Body Areas Injured in Timber Handling Tasks

| Body Area | Table-related Timber Handling Tasks | Saw-related Timber Handling Tasks | Filleting Tasks |
|---|---|---|---|
| Neck and head | 10 | 7 | 2 |
| Back and low back | 62 | 42 | 9 |
| Abdomen and chest | 5 | 1 | 1 |
| Shoulder | 20 | 12 | 3 |
| Arm | 21 | 11 | 6 |
| Wrist and hand | 35 | 18 | 5 |
| Hip | - | 1 | - |
| Leg | 5 | 12 | - |
| Ankle and foot | 7 | 4 | 2 |
| Unknown | - | 1 | 1 |
| **TOTAL** | **165** | **109** | **29** |

Again the pattern of injuries occurring in the trunk and upper limb is evident in these figures.

## Best Guess Data

Survey respondents (usually the person responsible for health and safety within the sawmill) were asked,"From your own experience in the sawmilling industry, what would you consider to be the five tasks most likely to lead to MSDs at mills around the country? What is it about each task that you feel makes it high risk". This qualitative information was requested to gain additional information from within the industry to strengthen the results from the Accident Register Survey. The 'Best Guess' question allows us some insight into their areas of perceived risk – and therefore their prevention priorities.

The most common task mentioned was timber handling tasks associated with green tables and dry mill, with 16 of the 33 mills rating them as the tasks most likely to lead to MSDs. A further 12 mills rated it from second to the fifth most likely task to lead to MSDs. This was almost triple the number of mills rating the second most likely task to lead to MSDs.

Table 4. Top Five Tasks and Reasons Why - From 'Best Guess' Responses

| Tasks | | Number of Mills rating this task | | | | | Weighted total | Main reasons given why tasks are high risk |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | | |
| 1 | Pulling timber, packeting, sorting, stacking – greenchain, long table, drymill, MSG, round table | 16 | 6 | 5 | | 1 | 120 | Twisting, turning, pulling. Heavy timber. Lifting. Repetitive. Poor technique |
| 2 | Stacking and filleting/defilleting timber - timber yard | 4 | 3 | 4 | | | 44 | Twisting. Lifting. Repetitive. Pushing/pulling. |
| 3 | Timber grading and sorting – greenchain | 1 | 6 | | 2 | 2 | 35 | Repetitive wrist rotation turning boards. Heavy lifting. |
| 4 | Tailing out at breast bench, resaw, edger, other | 2 | 4 | 1 | 2 | 1 | 34 | Repetitive heavy lifting, turning, twisting, pulling timber |
| 5 | Changing/working with heavy/awkward saws or other equipment - saw doctors/fitters | 3 | 1 | 1 | 2 | 2 | 28 | Awkward heavy lifting, twisting, turning, reaching. |

The task area clearly considered to be of greatest concern regarding MSD's is that to do with pulling and stacking timber from the green chain or table, or similar duties in the drymill. Filleting related tasks, timber grading and sorting activities, tailing out at saws, and maintenance tasks were also frequently identified as MSD problem areas.

# Limitations

There are some important limitations to bear in mind with these survey findings. These include the following:

- Only 37 out of approximately 330 sawmills were involved.
- The survey only includes 12 months of data.
- The method of selection of the sawmills may have reduced the representativeness of the sample.
- Differences in the level of detail recorded and provided by mills resulted in aggregating some of the data, with accompanying loss of detail.
- The data provides incidence only, not frequency or severity rates.
- The nature and extent of biases affecting the 'best guesses' and accident register data accuracy is unknown.

# Conclusions

Despite the limitations of this process, it has fulfilled the initial survey aims. The data provides a rationale for looking further at specific tasks and work areas in sawmills that did not exist prior to the survey. It has also served to raise awareness among sawmills of COHFE's research in this area, and provided further impetus for the development of a Sawmilling Injury Database (see COHFE Report Vol. 4 No.4, 2003).

The Accident Register Survey identified that millhands, tablehands and sawyers within the mills reported the highest numbers of MSD's. The Best Guesses data indicates that the mills consider the tasks of tablehands to be of greatest concern, then: yardhands, graders, sawyers and maintenance workers. It was therefore concluded that the task and work areas associated with the green or dry table/chain should be considered in subsequent studies, followed by filleting/defilleting and the work done by sawyers - particularly tailing out. The survey also identified slip, trip and fall injuries as a potentially under-recognised risk area.

Since this survey was conducted, more detailed research into timber handling tasks on tables and manual handling associated with filleting in the yard has been carried out. Recommendations from this work can be found in COHFE reports Vol 4 (3) and Vol 4 (6) .

# Acknowledgements

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## Relevant Publications


- Australia and New Zealand Standard Industrial Classification (ANZSIC) data (1993). Statistics New Zealand, Wellington.
- Forestry Statistics (2003). Policy Information Group, Ministry of Agriculture and Forestry, Wellington.
- Laurs, M. (2000). Analysis of ACC claims data for the period 1994/95 to 1998/99 for: Forestry and Logging, & Log Sawmilling and Wood Product Manufacturing. ACC Report.
- MAF (2001). New Zealand Forestry Statistics 2000. Ministry of Agriculture and Forestry, Wellington, NZ.
- Tappin, D., Moore, D., Vitalis, A. (2002). Surveys of Accident Register Records. Unpublished paper.
- New Zealand Forest Industry (2002). Facts and Figures 2001/02 & 2002/03. NZ Forest Owners Association, Wellington.


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