

Timber processing – analysis of ACC claims narratives

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1. Introduction

Research into injury occurrence and injury prevention in timber processing was funded by FRST in 2001-2003 and by ACC in 2006/7. Further research was proposed to inform subsequent work systems analyses and development of case studies based on successful interventions that have been implemented within the industry. The overall aim of the on-going work, also funded by ACC, is to develop industry resources based on industry best practice and research findings.

This report outlines key findings following analysis of the accident description data from all accepted ACC claims from the timber processing industry over a two year period, 1st January 2005 – 31 December 2006. The report compliments previous analysis of the same ACC data (Ashby and Tappin, 2007) which considered all other data variables except accident descriptions.

Over 11,000 claims were analysed: around 43% of all claims were musculoskeletal disorders (Figure 1), followed by lacerations/puncture/sting, accounting for 22% of all claims.

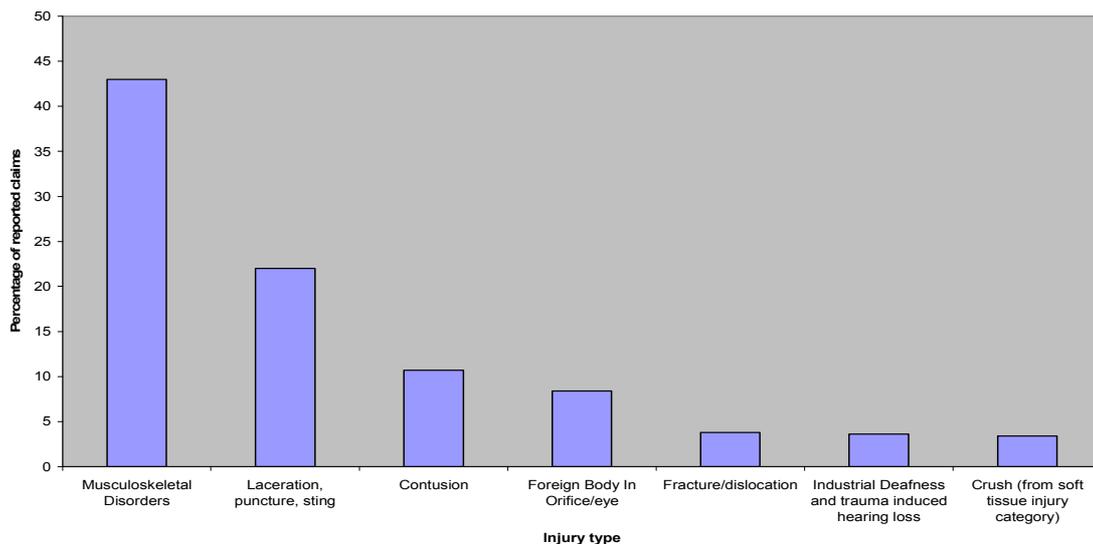


Figure 1: Main injury types of ACC claims 2005-2006

The sectors most represented included:

- The sawmilling sector, including timber resawing and dressing (48% of all the claims)
- Wood Product Manufacturing (18%)
- Wooden Structural Component Manufacturing (16%).

Over 70% of the claims were for Medical Treatment costs.

In this current analysis of the narratives, the aim was to derive information about the work tasks being undertaken at time of injury, the reported events that initiated the injury, and the reported agents that were involved in the injury. Of the total claims, 92% had some sort of accident narrative provided: 82% of these were from the three top representative industries and over 75% the top three injury types.

2. Stage 1 – Code development and pilot process

1% of the data (covering 1% of the top industry sectors) were sampled, to determine variables for subsequent data categorisation. During this process some reports not timber processing related were discarded. The first stage of sampling lead to a provisional list of variables, in five categories, as outlined in Table 1, and the 1% sample was coded accordingly.

Table 1: Category codes for narrative coding

Categories	Description
1 Process or task at time of reported injury	Eg filleting; grading
2 1 ^o action/event	Physical action or loss of control at time of or initiating the injury report eg 'slipped' or 'carrying' or 'pulling'
3 2 ^o action/event	Physical action or loss of control that the 1 ^o event may have lead to, eg 'slipped' (1 ^o event) then 2 ^o - 'struck by'
4 Injury agent	Product, tool, plant or materials used during timber processing activities including location and environment details
5 Load details	Weight, force, load characteristics if provided (e.g. 'heavy' or 'wet' timber; '10kg bag')

Following the pilot analysis of 109 reports:

- all 109 claims could be coded with respect to primary initiating action/event
- 64 reports (59%) were coded according to process or task
- 91 reports (83%) included an injury agent
- 15 reports (14%) offered more detail about the load.

To check the reliability of coding a second researcher coded the 1% selection, and codes were compared, which resulted in 83% of individual codes matching. Some changes were made to the variables following the piloting stage to allow as consistent as possible analysis and coding, across the various industry types.

3. Stage 2 – Analysis of narratives process

Following the first stage, a total of 10,229 reports remained from the original 11,124. Many narratives were brief and/or did not provide enough information to determine a code for analysis: a total of 47% of 51,145 possible fields were coded. Only 19 reports could be coded for all five variables (Figure 2).

The previously conducted analysis of data using ACC fields provided information about the industry classification and occupation of the claimant, with log sawmilling and redressing accounting for 48% of the tasks. These two fields however did not indicate the task being performed at the time of injury. In this analysis, category 1 (from Table 1) allowed a range of 28 task variables to be coded, which ranged across industry sectors and included for example handling timber, filleting/defilleting, operating machinery, using hand tools and conducting maintenance or cleaning activities. This variable could be coded in 32% of reports and 85% of these were in the top three industry sectors.

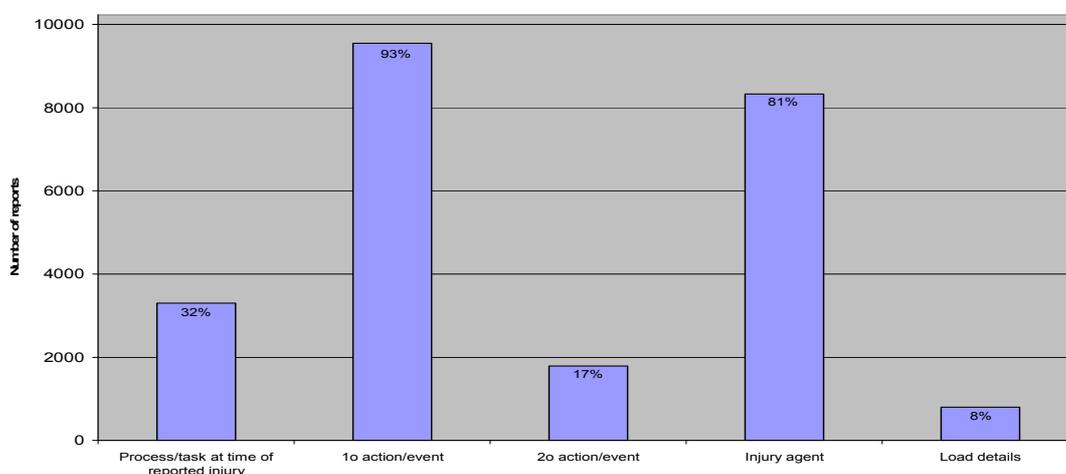


Figure 2: Claims coded according to narrative content

In category 2, over 93% of the reports could be coded according to the primary action at the time of (or initiating) the injury and most (over 88%) were in the top three industry sectors. A range of 27 codes included loss of control such as slip/trip/falls, handling activities such as 'carrying', 'lifting' or 'pulling'; 'infection', 'burns', 'exposure to noise' or to chemicals. The same codes were used to classify, where possible, secondary activity (category 3) – such as a 'struck by' event following an initial fall. 1789 reports could be coded for both primary and secondary actions.

There were 32 variable codes for the agent associated with injury (category 4) – including for example 'band saw/ saw/ blade', 'ladder', 'forklift' or 'timber'. The coding allowed for groupings of similar objects or agents such as 'floor/underfoot surface/debris on floor' etc. Over 81% of the narratives included information to allow coding of this variable, and around 8% had additional details such as load weight (category 5).

4. Log Sawmilling, Timber Resawing and Dressing

A total of 5,166 reports from the log sawmilling sector contained some sort of narrative data (Table 2). Of these, the **process or task at time of reported injury** main activity (570 reports) was pulling or handling timber – usually but not exclusively implying table work - stacking onto packets, and infeed/outfeed tasks. 64% of the reports did not include any information on processes or tasks.

Table 2: Top ten processes/tasks

Process or task at time of injury	Number of reports (%)
pulling or handling timber/table work	570 (11)
machine operation	202 (4)
maintenance/clean	154 (3)
forklift operation	140 (3)
using hand tool	93 (2)
sharpening blade/saw	87 (2)
walking/run/in transit	82 (2)
wrap/strap/packing	69 (1)
clearing/unblocking	67 (1)
changing blade/saw	56 (1)
blank	3282 (64)

When these tasks are linked to the diagnosis (previously established using ACC diagnosis plus READ code in Ashby and Tappin, 2007), some indication of the types of injury relative to specific tasks can be established:

- For pulling/handling timber, musculoskeletal disorders (MSD) predominate (61% of these tasks) followed by lacerations, contusions and amputations (21%).
- For machine operating, lacerations, contusions and amputations account for nearly 40% and MSD for a third.
- For maintenance and cleaning activities, 45% of claims were lacerations and contusions and 23% MSD. Both these task groups had over 10% of claims indicated as being ‘foreign body in eye’.

Around one third of the hand tool injuries (in the top three industry sectors) specifically identified nail guns as being associated with injury.

The **primary initiating action or event** was included in 92% of the narratives, the main factors (Figure 3) being:

- Manual handling related activities (e.g. lift, lower, bend, lean, reach, repetition, twisting/awkward postures)(28%)
- Struck by/against or cut by (23%)
- Slips, trips and falls from a height, or ascend/descend steps/stairs (23%)
- Caught by/caught between or crushed (11%)
- Foreign body (in eye)(7%)

The factors related to musculoskeletal disorders (MSD comprised a bigger percentage when including ‘grabbing or jarring, overbalancing’.

Information about a **secondary action or event** was included in 10% of cases where the primary initiating factors had been identified, and were primarily ‘struck by/against or cut by’ and ‘twisting/awkward postures’.

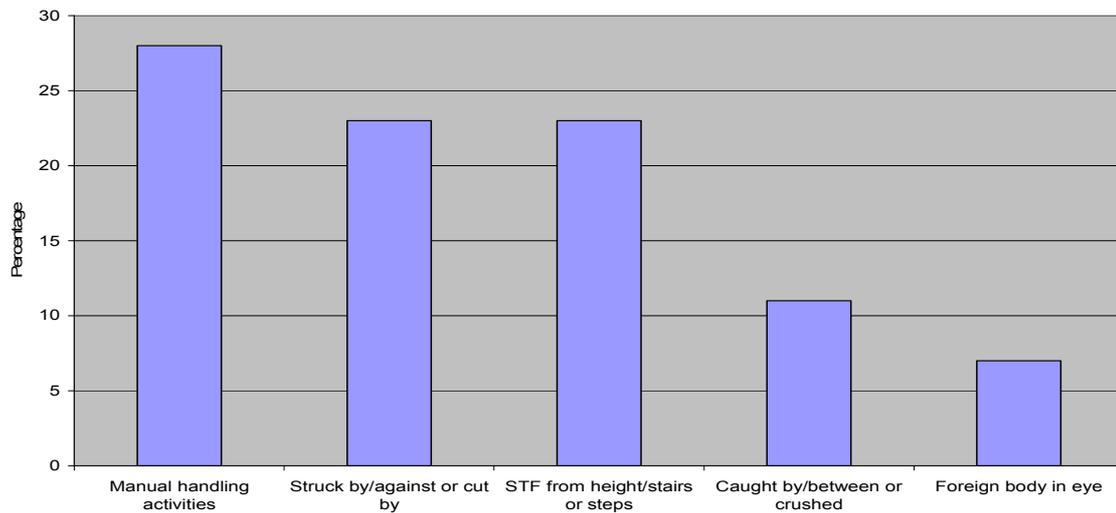


Figure 3: Initiating event according to narratives

The **injury agent** was indicated in 84% of cases. Over a third were associated with timber or wood (Table 3).

Only 8% of narratives indicated any **load or agent details**, such as specific weights or other characteristics, with most of these being 'heavy'. Identified weights ranged from 10kg to 100kg. Other factors noted as contributory were board lengths (eg 5 or 6m), 'wet', 'large' or 'slippery'.

Table 3: Top ten injury agents

Injury agent	Number of reports (%)
timber/wood/board	1788 (35)
sawdust/chip/foreign body/dust	359 (7)
machinery	286 (6)
band saw/blade/saw	175 (3)
floor/ underfoot surface/ debris	159 (3)
table/rollers/conveyor	157 (3)
log	150 (3)
splinter	150 (3)
forklift / forkhoist	125 (2)
packet/pallet/trolley/bearer	125 (2)
blank	838 (16)

When the narratives of the top few tasks (identified in category 1) were considered relative to the other categories (2-5), no useful additional information was derived.

5. Wood Product Manufacturing nec

A total of 1,495 reports from this sector contained some sort of narrative data. Most reports – 70% - did not contain data about the **process or task at time of injury**. Of the few that did, the main activities were using hand tools (7%), operating machinery (5%), or handling timber (4%)(Table 4).

Table 4: Top five processes/tasks

Process or activity at time of injury	Number of reports (%)
using hand tool	99 (7)
machine operation	68 (5)
handling timber/table work	66 (4)
carpentry/building/joinery	29 (2)
forklift operation	28 (2)
blank	1053 (70)

The **primary initiating action or event** was included in 94% of the narratives, with primary initiating factors being:

- Struck by/against or cut by (31%)
- Manual handling related activities (e.g. lift, lower, bend, lean, reach, repetition, twisting/awkward postures)(29% - 17% recorded as lifting)
- Caught by/caught between or crushed (9%)
- Foreign body (in eye)(8%)

Information about a **secondary action or event** was included in 12% of cases where the primary initiating factor had been identified, and as for sawmills, were primarily 'struck by/against or cut by' and 'twisting/awkward postures'.

Table 5: top ten injury agents

Injury agent	Number of reports (%)
timber/wood/board	306 (20)
sawdust/chip/foreign body/dust	108 (7)
packet/pallet/trolley/bearer	102 (7)
machinery	94 (6)
nail gun	88 (6)
band saw/blade/saw	55 (4)
hand tool	37 (2)
floor/ underfoot surface/ debris	36 (2)
other load	36 (2)
table/rollers/conveyor	36 (2)
mdf/ply/veneer	34 (2)
blank	286 (19)

The **injury agent** was indicated in 80% of cases and 20% were timber/wood (Table 5). Only 9% of narratives indicated any **load or agent details**, such as specific weights or other characteristics and most indicated 'heavy' load.

6. Wooden Structural Component Manufacturing

A total of 1793 reports from this sector contained some sort of narrative data. Most reports – 72% - did not contain data about the **process or task at time of injury**. Of the few that did, the main activities were using hand tools (8%), operating machinery (5%), or carpentry/building (3%)(Table 6).

Table 6: Top five processes/tasks

Process or activity at time of injury	Number of reports (%)
using hand tool	150 (8)
machine operation	98 (5)
carpentry/building/joinery	56 (3)
maintenance/clean	31 (2)
loader/loading	25 (1)
blank	1297 (72)

The **primary initiating action or event** was included in 95% of the narratives, with primary initiating factors being:

- Manual handling related activities (e.g. lift, lower, bend, lean, reach, repetition, twisting/awkward postures)(33% - 20% were 'lifting')
- Struck by/against or cut by (26%)
- Foreign body (in eye)(9%)

Information about a **secondary action or event** was included in 19% of cases where the primary initiating factor had been identified, again mostly: 'struck by/against or cut by' and 'twisting/awkward postures'. The **injury agent** was indicated in 80% of cases (Table 7). Timber/wood accounted for 11% with a further 9% identifying sawdust/foreign body/wood chip as the injury agent. Only 138 reports added further detail of the injury agent, most of these citing 'heavy'.

Table 7: top ten injury agents

Injury agent	Number of reports (%)
timber/wood/board	203 (11)
sawdust/chip/foreign body/dust	160 (9)
furniture/workplace structures	133 (7)
hand tool	102 (6)
machinery	96 (5)
band saw/blade/saw	78 (4)
framing/truss	77 (4)
mdf/ply/veneer	75 (4)
kitchen/ cabinet	72 (4)
nail gun	52 (3)
blank	357 (20)

7. Conclusions

The findings of the analysis are limited by the extent and quality of detail provided in the content, ranging from no narrative to detailed accounts of events. The degree to which the findings are representative of the workforce and work environments is unknown.

Improvements to the narrative data collected by ACC could significantly increase the worth of the data for research purposes. For example, the claimants could be prompted to indicate task, injury event and injury agent.

The detailed analysis of claims narratives further reiterates the need to examine musculoskeletal risks within the timber processing sectors, in particular in sawmills, along with lacerations, especially in machine associated activities and maintenance/cleaning tasks. The limited information provided restricts the ability to specify specific tasks merely from the narratives: for example, in describing being cut on machine blade, it is not clear who suffered the injury (such as saw doctor or machine operator) or what task they were performing (such as changing saw, clearing block, maintenance).

Narratives included a lot of information about events/ injury initiating activities – over 90% could be coded. These indicated that manual handling events (or other musculoskeletal related factors such as repetition and gradual process injuries) and ‘struck by/against’ or ‘cut by’ events as being the predominant injury causes. Less information was contained regarding the specific work activity or task being performed (a third of the claims could be coded).

However, in conjunction with the previous data analysis, some conclusions may be drawn:

The main tasks indicated in *sawmills and timber redressing* were:

- Table tasks/pulling or handling timber;
- Machine operation or related activities;
- Maintenance/cleaning activities.

Primary injury initiating events included:

- Manual handling related activities;
- Struck by/against or cut by;
- Slips, trips and falls from a height or on stairs/steps.

The most commonly identified injury agent was timber/wood – other injury agents were sawdust/foreign body; machinery; bandsaw/blades; underfoot surface or floor.

In *Wood Product Manufacturing nec* and *Wooden Structural Component Manufacturing*, similar factors were identified but with a few key differences from sawmills:

The main tasks were:

- Using hand tools (often nail guns);
- Machine operation or related activities;
- Carpentry/joinery/building activities;
- Maintenance/cleaning.

In Wood Product Manufacturing nec, the primary injury initiating events included:

- Struck by/against or cut by
- Manual handling related activities;
- Caught between/crushed;
- Foreign body in eyes.

In Wooden Structural Component Manufacturing, manual handling activities were again predominant over struck by events in the narratives. In these sectors timber/wood products were still prime injury agents, followed by wood chips; furniture/workplace structures, packets and trolleys, and hand tools also featured in reports in these sectors.

Table tasks/pulling timber have been the focus of previous work to identify risk and provide injury prevention recommendations. Previous work (Tappin et al, 2003) indicated 'tailing out at breast bench, resaw, edger, other' and 'changing/working with heavy/awkward saws or other equipment – saw doctors/fitters' as being among the top five risky tasks for MSD. Following consideration of that work, this analysis of narratives and the previous analysis of this ACC data, and anecdotal feedback from timber industry representatives, possible tasks requiring further examination may include:

- Machine operation and related activities such as machine maintenance
- Saw/blade changing tasks (sawdoctors)
- Use and design of hand tools/ nail-guns (particularly in manufacturing sectors).

References

Ashby, L., and Tappin, D. 2007. An analysis of ACC data for the New Zealand Timber Processing Industry. COHFE Report, Volume 8, number 6.

Tappin, D., Edwin, M. and Moore, D., 2003. Sawmill Accident Register Records: Main findings from a survey of 37 mills. COHFE Report, Volume 4 Number 5.

