

## Construction initiative – analysis of incident claim narratives: summary report



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### Summary of key findings

- Detailed analysis of 2 years of ACC data was completed in 2008. By analysing the narrative description given by claimants of events leading to their injury, useful information was gleaned about the construction process involved, the events surrounding injury, and agents associated with these injuries.
- Despite lack of incidence rates and data limitations of the narratives (varied level of detail, few records of chronic conditions, subjectivity in reports, spelling mistakes etc), findings serve as a guide towards further exploration of the issues.
- The analysis indicated that claim numbers are highest in house construction, with a peak in reports by males at age 20-24 years. Males comprised 97% of all reporting.
- Injuries to the lower back / spine were most common although the upper limbs had the most reports when results are combined into a 'body area'.
- Where the narrative descriptions identified a 'construction process' (i.e. work activity), higher claim costs were incurred through loading and unloading activities. Descriptions of 'cutting' in narratives were most prolific, yet these were generally associated with lower claim costs.
- Manual Handling / Posture related incidents (especially lifting) were the most commonly reported 'initiating event' (i.e. an event or action associated with sustaining the injury) described, and also make up the most serious claims; these were followed by fall and slip incidents.
- A huge number of different 'agents' (i.e. work items or conditions) were described by claimants. The 7 most frequently reported being wood / timber, vehicle related, cutter / saw, ladder related, roof related, and then scaffold and nail related items.

## 1. Introduction

When claimants lodge their claims with ACC, a large amount of data about factors associated with their injuries, like claimant occupation, age and location and injury diagnosis and body part, is collected. Many claimants also provide a description – or ‘narrative’ – of events surrounding their injury. In 2008, a full report was compiled by COHFE for ACC following a detailed analysis of 2 years of ACC data relating to the 21 construction industry Classification Units (CUs); CUs describe different trades or work types. This was a new initiative, which involved developing a narrative coding system for the incident descriptions, in order to identify details about common causal factors, and to help prioritise and direct further injury prevention initiatives.

This report summarises the key findings of that detailed analysis (Hide et al. 2008), so that industry and ACC representatives might be able to better target injury prevention efforts to reduce the risk of injuries to construction workers.

## 2. Methodology

ACC provided researchers with construction industry claims from a two year period (July 2005 to June 2007) for lodged entitlement and medical fee claims. There were just over 53,000 cases in total, of which a little over 48,000 appropriate cases included a narrative. All cases were analysed to provide background information such as gender, age and injury diagnosis. A 1% sample of cases with narratives was reviewed and three groups of variables were produced so that each narrative, through word search, was coded by: *construction process* (i.e. work activity), *initiating event* (ie event or action associated with sustaining the injury) and *agent* (i.e. work items or conditions) – examples are shown in Table 1. Two researchers (separately) then coded a random 1% of the narratives to establish reliability of the codes and coding process.

Table 1. Example of narrative coding

Narrative	Construction Process		Initiating Event (up to 4 coded)		Agent (up to 6 coded)			
	1	2	1	2	1	2	3	4
Working off step ladder, ladder tipped and fell on to elbow			Unexpected behaviour of an object	Fall	Ladder related			
carrying heavy timber and felt pain R shoulder			Carrying		Wood / timber			
when unloading palm fronds off a truck, a palm frond went into my left forearm	Load / unloading				Vegetation	Vehicle related		
nailing timber and shot nail up into L index finger	Nailing		Loss of manual control	Struck by something	Nail related	Wood / timber		
Walked under scaffold, knocked head on metal bar, hurting neck.			Walk / run / crawl	Struck on / against	Metal	Scaffold related	Bar/ rebar	Underneath
Carrying a full bag of cement from back shed out to trailer parked on street and fell, pain in back			Carrying	Fall	Bag / sack	Cement / mortar	Trailer / transporter	Storage unit

### 3. Data limitations

Limitations of the narrative data (such as the subjective nature of descriptions, spelling mistakes, provision of extremely varied detail for encoding across the three categories, few records of chronic conditions, and lack of worker employee numbers by CU and task to identify incidence rates) influences the assumptions that can be made – but the detail and richness does allow some confidence in using findings as a guide towards further exploration of the issues.

### 4. Results – background information from ACC classifications

There were 21 different Classification Units (CUs) within the ACC construction industry dataset. Although incidence rates are unknown the greatest number of claims was from the House Construction CU, followed by Road and Bridge construction and other non-residential construction.

#### 4.1 Demographics

- Males formed 97% of claims and females 3%, but cases with more women were represented in Road and bridge construction (12%) and electrical services (6%)
- Reports were greatest amongst 20-24 year-olds for males, with a second peak in the 35-39 age group, gradually tailing off with increasing age after that. The female claims peaked in the 40-44 year age group
- 75% of claimants identified themselves as Pakeha/European, 13% Maori and 4% Pacific peoples
- Claims were fewest during January and greatest during March and the winter months of August and November
- 92% of claims were from non-accredited employers – ie not in the ACC Partnership Programme
- Soft tissue injuries comprised 50% of diagnoses for males and 63% for females. A further 24% of injuries to males were from lacerations.

Table 2. Claims by body part and area affected.

Body area	Number of
<b>Upper limbs (inc neck)</b>	
Finger / thumb	6329
Hand / wrist	4269
Shoulder (incl Clavicle / blade)	2733
Upper And Lower Arm	2043
Neck, Back Of Head Vertebrae	2028
Elbow	1211
<b>Total</b>	<b>18613 (35.1%)</b>
<b>Back</b>	
Lower Back / spine	7977
Upper Back / spine	2020
Back Except Head Vertebrae	334
<b>Total</b>	<b>10331 (19.5%)</b>
<b>Lower limbs</b>	
Knee	2907
Ankle	2083
Lower Leg	1728
Foot	1335
Hip, Upper Leg, Thigh	1063
Toes	248
<b>Total</b>	<b>9364 (17.6%)</b>

Body area	Number of
<b>Head / face</b>	
Eye	5062
Ear	1784
Face	1165
Head (except Face)	818
Nose	85
<b>Total</b>	<b>8914 (16.8%)</b>
<b>Torso / internal</b>	
Chest	1049
Abdomen / pelvis	596
Internal Organ	140
Other Internal Organ	117
Lung	71
Kidney	1
<b>Total</b>	<b>1974 (3.7%)</b>
<b>Multiple locations or unobtainable</b>	
Multiple locations	159
Unobtainable	2386
(unrecorded)	1315
<b>Total</b>	<b>3860 (7.3%)</b>

## 4.2 Body part and area affected

The single injury site with the highest number of injury reports was the lower back / spine area (7977 cases, 15% of all reports) (table 2). However, where data are grouped to show body area affected, it is the combined effects of different injury types to the upper limbs that have resulted in greater claim numbers (35%). Eye injuries were also reported in high numbers (5062 cases, 9.5% of all reports).

## 5. Results – analysis of the narrative description

Just over 48,000 claims included a narrative, but the level of detail supplied was very varied. Of these 15,516 described at least one type of construction process (i.e. work activity) being undertaken at the time of injury, over 37,000 recorded at least one injury event (i.e. an event or action associated with sustaining the injury) and nearly 41,000 reported at least one agent (i.e. work items or conditions) in their description.

### 5.1 Construction process

Some narratives described more than one construction process, increasing the total number of reports to just under 16,000. Table 3 indicates the groups of construction processes and the most prevalent types of tasks within each group. However, ‘construction process’ details, of all the descriptions given, were provided in only 1/3 of all narrative cases.

Findings below refer only to narratives where a construction process is given, and the proportion (%) within those including the relevant report.

- *Creative - trade* activities associated with the relevant industry sector or trade are understandably commonly included in claimants’ descriptions (e.g. ‘painting’ for Painters and decorators; ‘plastering’ or ‘sanding’ for Plasterers).

Table 3: Construction process - Task specific data (number of reports)

<b>Destruction – revision</b>		<b>Creative - generic</b>	
Dismantling	581	Cutting	1970
Grinding	534	Sawing	1302
Repairing	297	Drilling	987
Demolition	285	Hammering	975
Sanding	253	Nailing	823
De-nailing	96	Screwing	119
<b>Creative - trade</b>		Operating NEC	112
Installation	601	Framing	104
Painting / decorating	576	<b>Preparation / clear-up</b>	
Laying	483	Load / unloading	1567
Building NEC	371	Clean /clearing	559
Electrical	323	<b>Generic ground - landscaping</b>	
Plastering / trowelling	270	Digging	934
Roofing	260	Driving / riding	288
Welding	207		
Pouring concrete	151		
Plumbing	92	<b>Grand Total (of most prevalent)</b>	15545

- *Generic ‘creative’* (productive) activities were the most commonly reported (43%).
  - Cutting, sawing (and these terms were often used interchangeably) were by far the most commonly cited creative activities described in incident descriptions, followed by drilling, hammering and nailing

“Cutting with a knife, slipped and cut finger on L hand”

- Although 'cutting' is the most frequently cited construction process in included incident data a large proportion relate to lower cost claims. In contrast greater claim costs for sawing activities indicate that these incidents have greater and more serious consequences "Skillsaw slipped - cut into R leg"
  - Highest proportions of incidents while cutting were in the CUs that represent trade specific occupations, such as Glazing (28%), and Tiling & carpeting (27%). In contrast incidents whilst sawing were related to more generic construction activities
  - Incidents while drilling were most closely associated with expected trade types, such trades as Electrical (21%), Plumbing (15%) and Roofing (13%)
  - Incidents that cited hammering were not linked to any specific trade type and were associated with more generic activities.
- *Preparation and clear-up* were included in at least 20% of descriptions for six CUs.
    - The activity most commonly reported here was loading and unloading (1567 cases overall ), although incidents involving cleaning / clearing were also prominent "Lifting toolbox onto trailer, hurt lower back"
    - Loading / unloading resulted in the greatest volume of higher cost claim types. The volume of lower cost claim types was also high - second only to those from cutting
    - Loading / unloading is most prevalent for the following CUs:- Bricklaying services (17%), Road and bridge construction (16%), Site preparation services (16%) and Landscaping services (16%). "Lifting machinery onto work vehicle, concrete mixer, halfway thru lift experienced back pain"
  - For *Ground and landscaping* tasks, digging was most commonly reported. This includes both manual and motorised activities and was most prevalent for those undertaking Site preparation (15%), Landscaping (15%), Road and bridge construction (13%), Non – building construction (13%) and Plumbing (10%).

## 5.2 Initiating (injury) events

More claimants included information about 'Initiating event' than 'construction process'. Some recorded more than one initiating event, resulting in a total of 48,730 reports overall. The main event categories and most prevalent specific events contributing to them are presented in Table 4.

Findings below refer only to narratives where an initiating event is given, and the proportion (%) within those including the relevant report.

- *Manual handling and postural* related incidents were reported in at least 25% of all included CU reports and average 31% of all such cases overall.
  - Highest proportions of CUs that described manual handling and postural related incidents were for trade based occupations, such as Tiling & carpeting (49%), Bricklaying (42%), Landscaping (39%), Glazing (38%), and Plastering & ceiling work (37%) "Lifting sheet of heavy gib board into awkward position and strained left elbow".
  - Lifting accounted for the majority of manual handling and postural injury initiating events, yet there is a prevalence of other terms describing the many varied postures associated with injury occurrence "carrying plaster into work site hurt back"

- Lifting resulted in the greatest volume of both higher and lower cost claim types, indicating incidents with both shorter and longer term consequences.

Table 4: Initiating event category (number of reports)

<b>Manual handling - posture</b>		<b>Exposure - uncontrolled conditions</b>	
Lifting	8320	Fragment into body	5119
Carrying	2102	Struck by something	3416
Pulling	932	Trapped / caught in	1152
Bending / leaning	904	Unexpected behaviour - object	1142
Twisted / rotated	547	Brace / torque against force	988
Kneeling	466	<b>Transit – STF – misstep</b>	
Overhead / reach	430	Fall	3958
Pushing	379	Slipped	3634
Stood up	245	Transit- down	1998
<b>Exposure - harmful agents</b>		Trod on	1227
Exposure - noise	1389	Walk / run / crawl	964
Exposure– harmful product	435	Tripped	888
Exposure – fire / heat	289	Transit - up	637
Bitten / stung	264	Jumped / hopped	540
<b>Chronic exposure</b>		<b>Personal loss of control</b>	
Repetitive activity	629	Struck onto / against something	2948
		Loss of manual control	2460
		<b>Grand Total</b>	<b>48402</b>

- ‘Exposure to uncontrolled conditions’ had high levels of reporting (15% - 37%)

- many involved ‘fragment into body’ yet these were often associated with high volume, but lower claim costs
- ‘Unexpected behaviour - object’ included movement or failure of equipment that contributed towards the injury initiating event.

“sanding kwilla timber & got a splinter under the nail of my right middle finger”

” working on platform which broke, fell 3-4 feet to ground, hurt L ankle”

“ladder slipped from wall, fell about 2 meters onto both wrists”.

- The third main initiating event category concerned incidents that involve some form of *transit, slip trip, fall or misstep*. These were most common in CUs working off the ground - Painting and decorating (35%), Roofing (34%), and Plastering and ceiling (32%).

“plastering wall stepped off ladder onto a block of wood throwing me to floor”.

- Falls were the most commonly cited cause (and second only to ‘lifting’ in terms of volume of more expensive claims). Numbers experiencing a slip were also high, yet fall and slip were terms were often used interchangeably or together
- Some narratives also included information about level change, with figures for descent ‘transit – down’ indicating that this is an area of concern.

- *Personal loss of control*, in particular ‘struck against’ incidents (and also some ‘struck by something’ events) often occurred through individual action or were secondary to some form of loss of control.

“knocked knee on ladder as working on roof”

“nailing timber and shot nail up into L index finger”

- *Chronic exposure*, in particular repetitive activity, is likely to be underrepresented as narrative descriptions mainly include a trigger or singular event which initiated a claim and this makes it difficult to determine the chronic nature of conditions.

### 5.3 Agents

There were 12 categories of 'agents' with numerous examples within each. At least one agent was captured from 40,924 claims descriptions – and many narratives included more than one agent (up to 6) associated with their claim and totalling almost 65,000. The categories gave insight into detail such as presentation style of the agent (eg bag, piece; splinter; board); agent type (plant/equipment; ancillary equipment); types of hand tools; ground or environment characteristics. Findings below refer only to narratives where an agent is given, and the proportion (%) within those including the relevant report.

The 7 most frequently reported agents, in descending order, are most prevalent among the following CUs:-

- Wood / timber
  - Carpentry (10%), House construction (9%) and Non – residential building construction (7%)
- Vehicle related (including different vehicle types or specific parts)
  - Road and bridge construction (12%) and Site preparation services (12%)
- Cutter / saw (including knives, cutters, saws, snips etc.)
  - House construction (11%) and tiling and carpeting (7%)
- Ladder (including step-ladders)
  - Painting and decorating (13%), Electrical (8%) and Plastering and ceiling (6%)
- Roof related (including ridges, trusses, purlin, skylight, rafters etc.) – cited in 25% of Roofing incident descriptions
- Scaffold & trestle related (including platforms and towers)
  - Painting and decorating (9%), and Plastering ceiling (7%) and bricklaying (6%)
- Nail related (including nail guns, nail plates and staples) – cited in 9% of House construction incident descriptions

When comparing these seven with claims data, it is the ladder related, followed by vehicle related that are the most prominent in terms of cases that incur higher costs.

A few reports included information about heights and/or weights which, although not comprehensive, do give an impression of the typical weight (or perception of 'heaviness') and heights encountered during the injury events. The term 'heavy' was used 2579 times in narratives, and in some cases the load weight was indicated. Recorded weights ranged from 2 to 800kg – most frequently occurring was 40kg; nearly half were cement bags. Height was noted in 477 narratives and ranged from 20cm - 15 metres; most frequently occurring was 1.5 – 2metres and, alone, 3 metres.

Within the 12 categories, key findings indicate:-

- Of *materials* identified, wood/timber, concrete and steel were the most commonly cited
- Ladders, scaffold and nail related items were the most common *ancillary equipment* reported
- Civil plant accounting for the majority of the *larger plant/equipment* reports
- Almost 30% of the 8662 records of *Hand tools/smaller tools* were cutter/saws, followed by other nail related incidents (often nail gun misfires) (23.5%)
- Almost 20% of *structure and linings* identified were roof related objects, followed by gib/plaster related products (11.5%).
- *Fixture, fittings and finishes* tended to relate to those of specific trades, such as floor covering agents (24%) and tiles (12%) for Tiling and Carpeting Services.
- *Presentation style* shows prevalence, in order, of the terms 'piece', 'debris/dust', 'splinter / chip' and 'sheet' in narrative descriptions.

"lifting timber and wrenched right shoulder"

"Driving bobcat - hit an object and was thrown forward, hurting back"

## 6. Conclusions

Summary data of all the aspects of the narrative which were coded provide an impression of the varied and widespread problems experienced across the industry. Through isolating highest frequency or most expensive claim types, either by CU or across industry, areas of concern have been identified. For example:-

- loading / unloading activities and use of common hand tools for cutting / sawing, drilling, hammering, nailing etc (among commonly described construction processes)
- the high prevalence especially of manual handling type incidents. Also of activities leading to falls and slips, and of exposure to uncontrolled conditions (among commonly described initiating events)
- interaction with wood, vehicles, and working at height with equipment such as ladders and scaffolding (among the many identified agents).

Whilst we must remain cautious of limitations within the data set these most commonly identified coded variables in each grouping could be used to help prioritise or target injury prevention efforts. Future initiatives may also be directed at refining the data collection processes and coding categories, with further examination between variables to provide more insight into specific injury scenarios and further direct injury prevention strategies and hazard control measures.

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## Reference

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