Analysis of forestry work accidents in five Australian forest companies for the period of 2004 to 2014

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Background

- More than 75000 people working in forest/timber sector.
- Current research focus on trees/machines/products.
- Little known about workers/operators health and wellbeing.

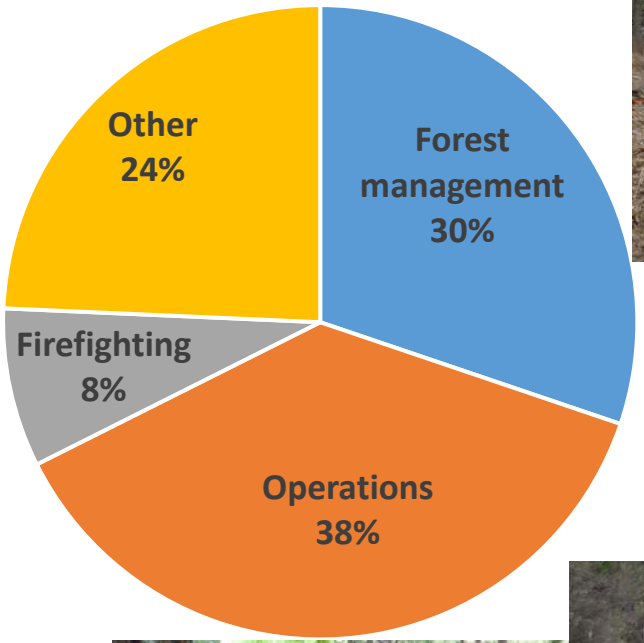
Study

- Objectives: Analyse the frequency, type and root causes of work accidents.
- Questionnaire sent to five industry partners of AFORA. The period from 2004 to 2014.
- Root causes: Personal errors (lack of PPE, poor position/technique,…), Environment and System.
- Body parts: Upper body (including hands/fingers), Lower body and head/neck.
- Injury types:

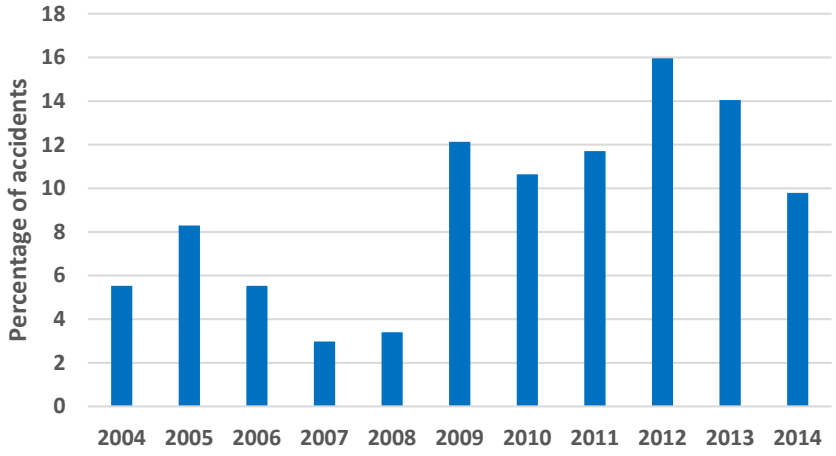
Skin damages (cut, abrasion, scratch, rash, burnt and laceration)
Contusion (bruise/struck, fracture, dislocation, struck and broken bone)
Muscular damage (strain, sprain and soft tissue)
Others (object in eye, bitten by insect/snake, blood nose, infection and dehydration).

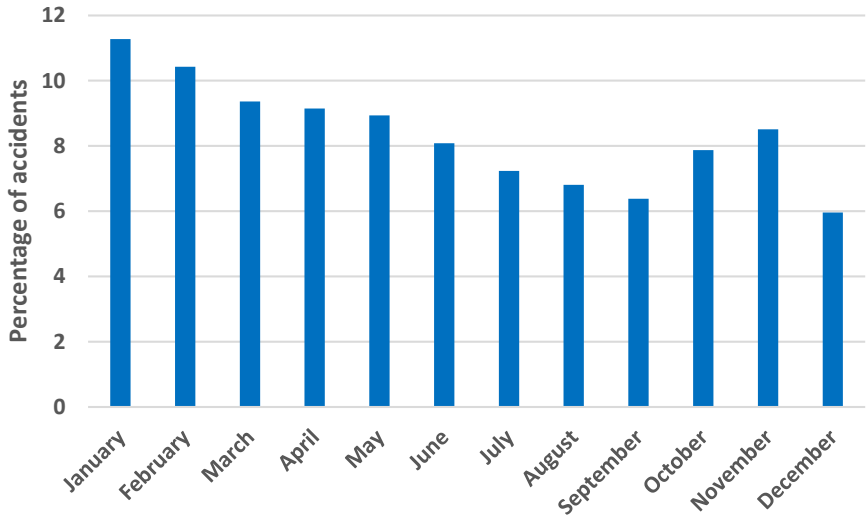
Results

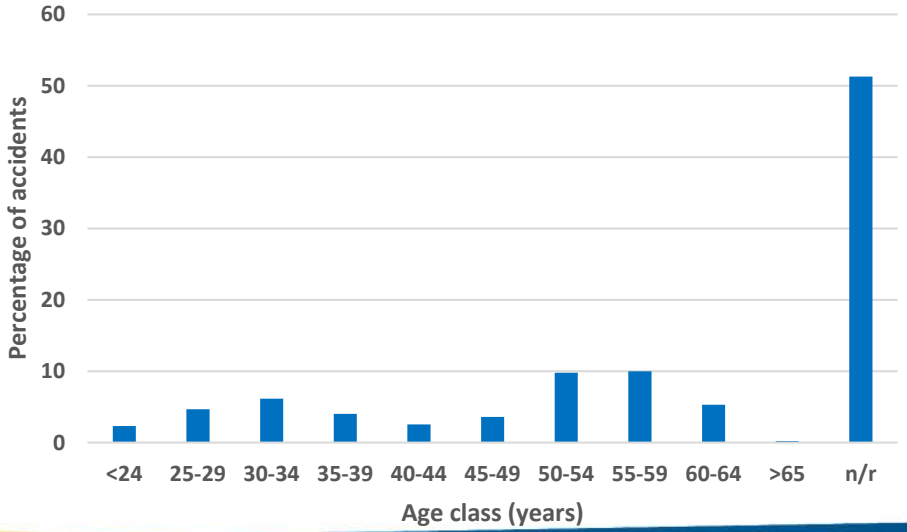
- Total accidents: 470 (=43 a./year)
- 14.4 accidents per million m^3 of wood



Distribution

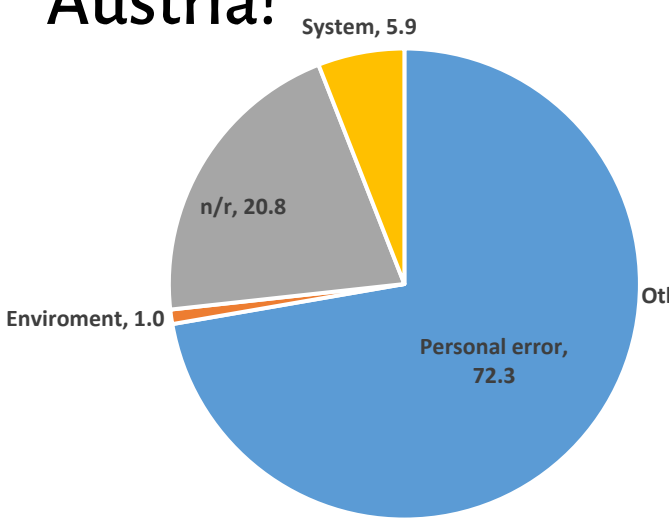


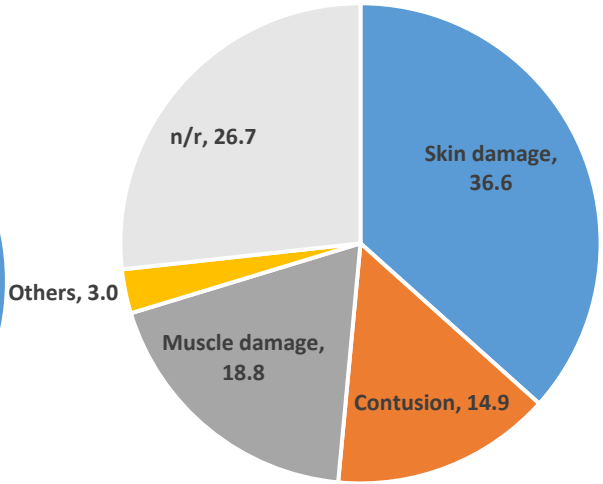


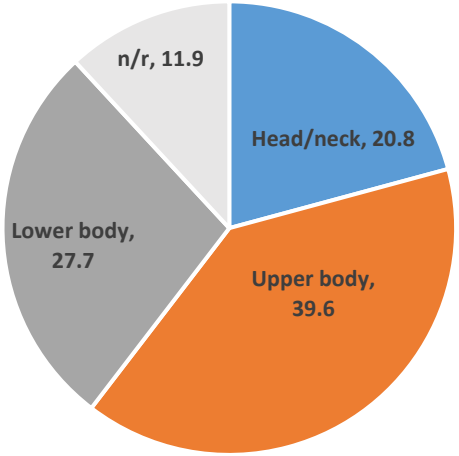


Harvesting operations

- Severity rate: 2.85 accidents/ million m³ of harvested wood.
- Lower than 6.03-12.00 accidents/ million m³ for harvesting in Austria!

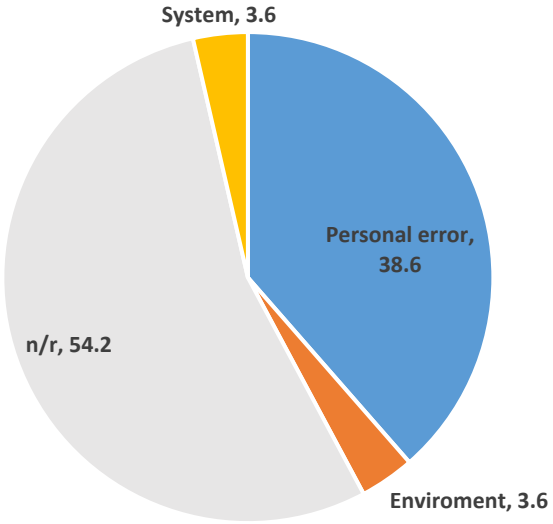


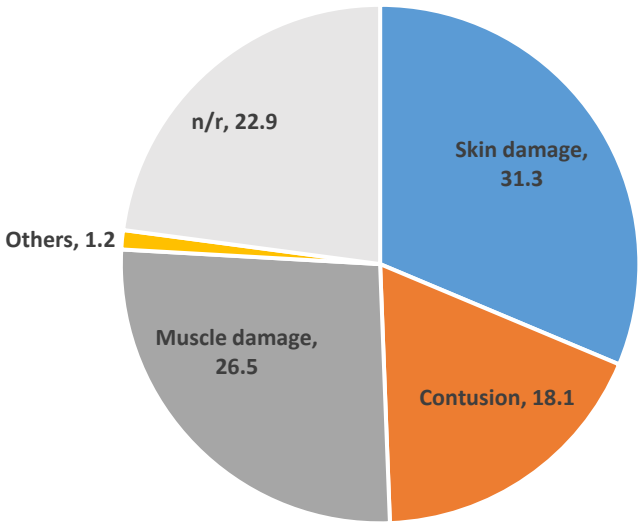


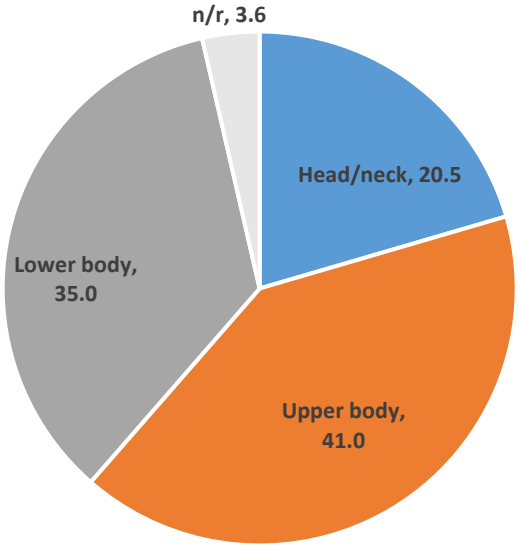


Silviculture

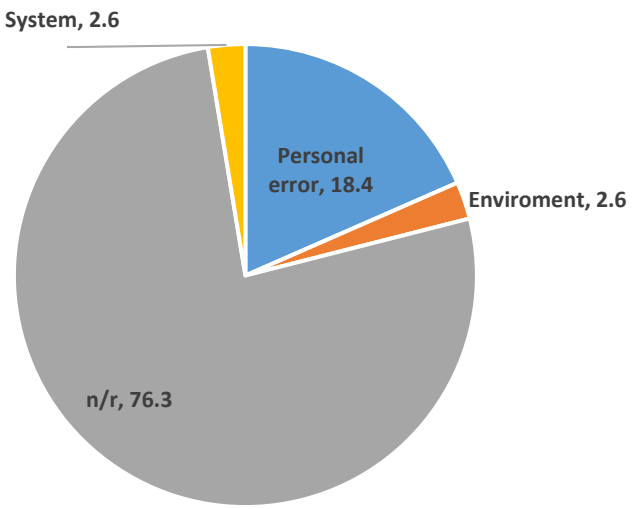
- 18% of total accidents.
- Only 3% of total accidents in Sweden.

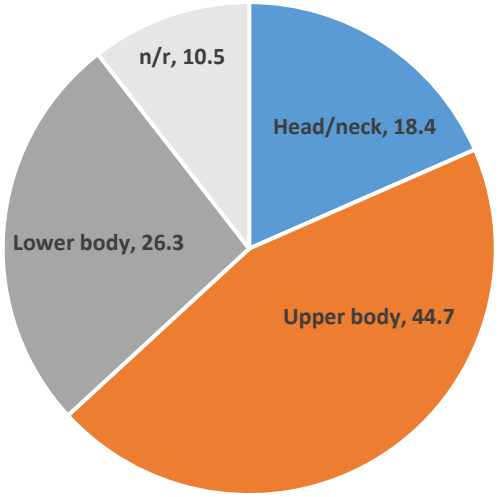


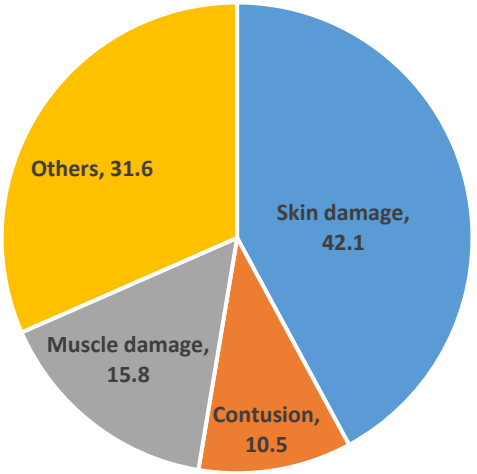




Forest firefighting







Head/neck injuries: 9.3%, Lower body: 35%, Upper body: 25%

Skin damage (burn, wound…): 27.9%
Muscular damage: 29.4%

USA case study (2010) on federal wildland fire fighting

Outcomes

- Need to improve incidents reporting system (near miss, lost time, evaluate recovery cost…).
- A short industry bulletin and a journal paper.
  Improve safety/health.
  Potential saving on medical costs ($0.5 million per year).
- Personal error is main root cause … improve work safety training.
- Upper body (back/shoulders) is most injured part with muscular and skin damages… provide more ergonomic training and use safety cloths/equipment.

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Forestry work accident rates: a case study for 2004 to 2014

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Introduction

Research projects carried out by CRC for Forestry and AFORA have investigated economic and environmental impacts of forest operations. These projects have mostly helped the industry improve machine productivity, reduce costs of harvesting operations, reduce the potential environmental impacts and improve yield and stand productivity. However, there is little knowledge available regarding Australian forestry work safety and accident rates. Machine operators and forestry workers are a vital part of the forestry sector, and their health and well-being can greatly impact on their work quality and efficiency. To increase our knowledge on forest workers' safety, this project aimed to analyse the frequency, type and root causes of work accidents which occurred within different forestry activities of five industry partners of AFORA over the period from 2004 to 2014.

Research method

Five industry partners of AFORA (27% of total) participated in this project. A questionnaire was designed and distributed to the partners to collect the safety incident reports from 2004 to 2014 (this period was selected to match most of the provided information of each partner). The information was classified and put in a Excel-based data base including; date of accident, time of accident, type of forestry activity, operation, harvesting system, harvesting machine/forestry tool, age of worker, root cause, category of accident, type of injury, injured parts, side of body, type of first aid provided, number of days off work, cost paid for medical insurance/treatments and employment type. Root causes were classified into personal errors (fatigue, lack of personal protective equipment (PPE), operator error, poor body position, poorly applied technique and poor judgment), environment (such as poorly maintained equipment and excessive heat) and system (such as lack of safety training, pre-existing injuries). The body parts were classified into the upper body (including hands/fingers), the lower body and head/neck. Injury types were classified as skin damages (including cut, abrasion, scratch, rash and laceration), contusion (bruise/struck, fracture, dislocation, struck and broken bone), muscular damage (strain, sprain and soft tissue), and others (object in eye, bitten by insect/snake, blood nose, infection and dehydration).

Results

The total number of work accidents was 470 for 11 years (a rate of 43 accidents per year). Considering the estimated yearly production rates of the industry partners that participated in this project, the accident rate was about 14.40 accidents/million cubic meters of harvested wood. Frequency and percentage of the work accidents for each forestry activity are presented in Table 1.

The majority of accidents occurred in operations (37%) and forest management (30.2%). Operations included harvesting, transport and roading. Forest management included activities such as silviculture, planting, nursery, planning, assessment, establishment, and fertilisation. Based on the results 8.1% of the accidents occurred during firefighting. Figure 1 presents the distribution of accidents for different

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Analysis of forestry work accidents in five Australian forest companies for the period 2004 to 2014

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ABSTRACT: There is little knowledge available regarding Australian forestry work safety and accident rates. Machine operators and forestry workers are vital parts of the forestry sector and their health and well-being can greatly impact on their work quality and efficiency. To increase our knowledge of forest workers' safety this project aimed to analyse the frequency, type and root causes of work accidents which occurred within different forestry activities of five industry partners of Australian Forest Operations Research Alliance over the period from 2004 to 2014. A questionnaire was designed and distributed to the partners to collect the safety incident reports. Total number of work accidents was 470 for a period of 11 years (a rate of 43 accidents per year). Considering the estimated yearly production rates of the industry partners that participated in this project, the accident severity rate was 14.40 accidents per million m³ of harvested wood. The majority of accidents occurred in harvesting operations (37%) and forest management (30.2%). Based on the results 8.1% of the accidents occurred during firefighting and 24.3% of work accidents occurred in other forestry activities. Main root causes of accidents for different types of activities were personal errors such as lack of personal protective equipment, operator error, poor body position and poor techniques applied. Work safety training could be delivered to forestry personnel to minimise accidents caused by personal errors. Back and shoulder (as upper parts of the body) received most injuries. To avoid/reduce muscular damage (such as strain and sprain) the workers should be provided with proper ergonomic training.

Keywords: operations; safety; accident rate; root cause; injury; protective equipment

Research projects carried out by Cooperative Research Centre for Forestry and Australian Forest Operations Research Alliance (AFORA) have investigated economic and environmental impacts of forest operations. These projects have mostly helped the industry improve machine productivity, reduce costs of harvesting operations, reduce the potential environmental impacts and improve yield and stand productivity (Acuna et al. 2012; Ghaffariyan et al. 2012, 2015; Ghaffariyan, Brown 2013; Ghaffariyan 2015). Machine operators and forestry workers are a vital part of the forestry sector and their health and well-being can greatly impact on their work quality and efficiency. Work accidents may also impact on the labour cost due to the required absence time for medical recovery (Klen 1989). Potočnik et al. (2009) studied the accidents of the forest harvesting operations in Slovenia for the period 1990 to 2005 and reported that 685 accidents occurred in felling operations while skidding operations had the lowest share of accidents (29% of the accidents). Other researchers also indicated that tree felling and wood extraction cause a larger number of accidents than loading or transportation (Evanson et al. 2001; Parker et al. 2002; Nikooya et al. 2012). Peters (1991) mentioned that felling trees with a chain saw caused more injuries than any other forestry tool/equipment. However, there is little knowledge available regarding Australian forestry work safety and accident rates. To increase our knowledge on forest workers' safety this project aimed to analyse the frequency, type and root causes of work accidents which occurred within different forestry activities of five industry partners of AFORA over the period from 2004 to 2014.

Potential future researches

Forest workers health/ergonomics/nutrition.

Mental stress and physical strain for harvester operators.

Reduce fatigue level for truck and machine drivers.

Thank you!

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