



## Uptake of Human Factors & Ergonomics Research - A Review of the Literature

### Summary

The FFR project "Uptake of Human Factors Research" aims to determine if Human Factors & Ergonomics research in forest harvesting has been taken up by industry. The first stage summarises the areas of New Zealand harvesting research identified in the literature. The next stage of the project will measure the success of this research.

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### Introduction

This review was compiled as an output of the FFR project "Uptake of Human Factors Research" in the New Zealand forest harvesting industry.

The aim of this project is to determine if Human Factors & Ergonomics research in forest harvesting has been taken up by industry, and whether it has made a difference. Also, if the research has not been taken up, why not?

An Initiatives Summary Table of research is being developed which:

- identifies Human Factors and Ergonomics research that has been done in the harvesting industry
- details the initiatives that have arisen from the research
- presents the results of any evaluations of those initiatives.



*New Zealand research (by LIRA) was used in the development and evaluation of chainsaw-cut-resistant leg wear. This protective leg wear has dramatically reduced the frequency and severity of chainsaw lacerations to the legs of chainsaw operators.*

### Summary of Research

#### 1. Technical: Clothing and Equipment

Areas of research identified to date:

- machine cab design
- protective legwear
- high visibility clothing
- spiked boots
- protective footwear
- helmet longevity
- chainsaw size - matched by task
- protective eyewear
- vehicle cab rear vision systems
- static delimbing.



*The static delimber was evaluated for industry, and its use resulted in significantly fewer branches and other tripping hazards left on the ground. In the study, delimbing time was reduced from an average of 214 seconds per stem to 84 seconds per stem. In addition, logmaker chainsaw sharpening breaks were reduced from one every 29 minutes to one every 53 minutes.*



*Distinctive high visibility clothing was developed by researchers and the forest industry to reduce the frequency of potentially fatal “not seen” incidents. Since the introduction of this clothing the number of “not seen” injuries has reduced to almost nil from 12 in 1992. The clothing has since been adopted by many other industries.*

## 2. Training and Education: skills and awareness

Areas of research identified to date:

- physiological workload by task
- fatigue and sleep loss
- fluid intake and nutrition requirements – dehydration and performance
- repetitive motion injuries
- mental workload of machine operators
- safety attitudes of forest workers
- hazard identification in felling and delimbing
- skill acquisition
- literacy of forest workers
- risks particular to static work.



*The performance of logmakers in six logging crews was assessed by a detailed field study. Boredom had a significant effect on log-making performance, resulting in a 6% decrease in value from a 2-unit increase in boredom factor. This study recommended greater task variety through job rotation within logging crews to optimise performance.*

## 3. Environment, Work Organisation and Management

Areas of research identified to date:

- thermal environment
- skid site hazards and layout
- work on slippery or sloping surfaces
- visibility in the forest environment
- workspace (cab) layout
- managing contractor performance
- breakout retreat distances
- log making performance
- factors in attracting and retaining skilled workers
- stress and job satisfaction
- leadership styles
- shiftwork and scheduling.



*Efficient landing layout is essential for productivity and safety*

## Discussion

The most significant barrier to compiling what is clearly a most valuable and informative international research resource, has been the lack of reliable and objective evaluation studies. There has been no substantial evaluation of the effectiveness of interventions arising from research programmes.

Also absent is a sound progression of new ideas through from evidence-based innovations – to field trial – to operational trial – to full operational status. The industry is denied opportunity to learn all it could from the investments that are made.

The next stage of this project will investigate comparable international initiatives in harvesting research. Then the impact of research initiatives will be measured by canvassing industry experts – crew members, contractors, forestry company staff and trainers. Successful projects will be identified and the methods used in those projects to achieve effective uptake will be detailed in a report.