

Harvesting and safety

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Regardless of how New Zealand's current forestry safety record compares with other countries, or how it compares with the past, the recent rate of deaths and serious injuries is unacceptable. While a safety culture with workers looking out for themselves and their work-mates is very important, there is only so much that tail-gate meetings, correct clothing, acceptable production pressure and the like can achieve. I share the view that logging safety in New Zealand will only be significantly improved when there is '*no worker on the slope, no hand on the chainsaw*'. This will only be achieved through the mechanisation of harvesting operations.

Simultaneous with the need to mechanise for reasons of safety, logging productivity must continually improve in order for New Zealand to remain competitive with other forest products exporting countries. Costs must be driven down. It is unlikely that a logging crew can be made to run faster, fell a tree more quickly, or attach chokers with more alacrity in the chainsaw, motor-manual environment.

Mechanisation under New Zealand's conditions is not straightforward. There are very good economic and physical reasons why full mechanisation has not been achieved to date. It is not merely a reluctance to invest the large capital sums required, nor is it due to the arms-length management and responsibility of the forest owners, and logging contractors are not incompetent or short-sighted.

There are three major factors which in various combinations and degree affect New Zealand harvesting mechanisation:

- Large, long stems, rough branches and sweep, wobble and kink
- Steep slopes with fragile soils
- The risk of poor log-making with sub-optimal value recovery.

A fourth factor will very shortly become important: the small coupe size of the farm-forest set apart from its neighbours.

New Zealand differs from other regions. It is not sufficient to entirely rely on overseas equipment manufacturers providing us with the same machinery sold elsewhere that will somehow give us a competitive advantage. The success of companies such as Waratah and Satco in designing felling heads tailored to our conditions (and exporting around the world) should be some indication.

There are four papers in the current Journal that provide an overview of New Zealand R&D into harvesting: describing the factors in mechanising steep country operations; summarising the recent work and outputs of Future Forests Research Ltd (FFR); asking whether New Zealand is keeping up with overseas trends; and

presenting the concept of high performance work systems to integrate business, people and work organisation with safety and R&D implementation. A fifth paper by Russell Dale, newly appointed R&D Manager at the NZ Forest Owners Association, provides an overview of the changes to the funding and organisation of R&D arising from the forest growing levy and the impact on the FFR Steepland Harvesting research programme.

While New Zealand should avoid mistakes made in other countries of a government-funded organisation on its own, expensively developing logging machinery that was ultimately not widely implemented, there are opportunities with new developments in robotics, automation and image processing that can assist in machinery specific to New Zealand conditions. The tethered harvester with the cable under tension and the cable-drum mounted either on the machine or on a dozer at the top of the slope is one such example. While the algorithms implemented by on-board computers for optimal log-making have been known for several decades, acquiring the stem-quality data in addition to that inferred by stem diameter is difficult but may now be possible. The extra stem-quality data are not necessary in Scandinavia, but failure to do so in New Zealand is one reason for significant loss in potential value compared to inventory. Rien Visser and his co-authors state that there is great opportunity for research on integrating individual new developments into an 'advanced steep terrain harvesting system'.

The amount of funding for FFR harvesting research is just over \$1 million per year from both government and industry, enough for approximately four full-time equivalent science staff. It ends in 2016. There is no funding from the new forest levy. The programme has been successful in carrying out applied research, decrying publication in prestigious 'high-impact' international science journals in favour of communication with practitioners. In her *National Business Review* column of 20 September 2013, Jacqueline Rowarth, Professor of Agri-business at the University of Waikato called for more stability in science funding so that science offers a rewarding career. She pointed out that three-quarters of science staff at Crown Research Institutes would not encourage their children into research.

Unless the funding is replaced, capabilities that have developed at Scion, the University of Canterbury and New Zealand engineering companies, along with the applied research project and technology-transfer management that FFR has developed, will be lost. Given the success in other countries in improving safety by the mechanisation of logging, as well as increasing productivity, workers who continue to be asked to perform on the ground in difficult and dangerous conditions will undoubtedly become concerned.



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