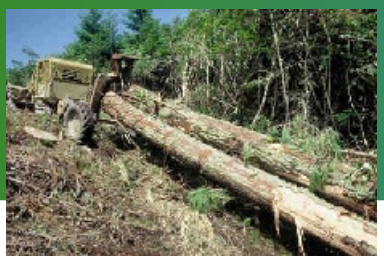
FUTURE FORESTS RESEARCH



HARVESTING THEME UPDATE

Issue Number: 5

Theme Leader: Keith Raymond

Date: April 2009

Executive Summary

Theme Members Meeting held in Rotorua, 24-25 March 2009

International collaboration between researchers with local input from New Zealand forestry companies was demonstrated with the cross pollination of ideas between Australia, New Zealand and Italy during the recent Harvesting Theme members meeting in Rotorua. The meeting was in three parts, a presentation of current FFR Harvesting Theme research, presentations of other harvesting research undertaken recently in New Zealand , Italy and Australia, and a look forward to the proposed 2009/10 FFR Harvesting Research Programme.

The other harvesting research work comprised presentations by Dr Rien Visser of the School of Forestry, University of Canterbury, Raffaele Spinelli of the Timber and Trees Institute of the National Research Council (CNR Ivalsa) in Italy, and Mark Brown, Programme Leader, Harvesting and Operations for the Cooperative Research Centre for Forestry in Australia.

The (very professional) presentations held more than just casual interest for most participants – developments and insights in one country often had interesting insights for the NZ harvesting sector. These presentations are available on the FFR website.

Ideas for next year's research programme were then presented and discussed. Far from being a disparate bunch of projects, the ideas were linked to the Harvesting Research Strategy developed at the Strategy Workshop in July last year. While the research project ideas were in the earliest stages of formulation, with some direction from the industry, and in some places some consolidation and refocusing of ideas, the future research programme looks good.

BACKGROUND

Russell Dale summarised the structure and funding of the Future Forests Research programme covering the four themes: radiata pine, diverse forests, harvesting and environment and social. The Radiata Theme has been functioning since October 2007, and the Diversified Species was the next one off the block. In terms of financial support the Radiata Theme is the largest ($3.56M) followed by Environment and Social ($1.83M) and Diverse Forests ($1.65M).

Russell also summarised the funding agencies (FRST, MAF, SFF, FIDA, etc) and the need for the Harvesting Theme to gain some investment from the Government, through the FRST Research Consortia funding. This operates on a 1:1 funding basis with a minimum of $500,000 industry investment. An application for this funding is in preparation.

CURRENT RESEARCH PROGRAMME

Real Time Productivity Data Collection

Tony Evanson summarised the work completed in this area over the last 3 Quarters.

The full Report of the trials with the MultiDAT electronic data logger has been published to members. The Report showed that the MultiDAT is a useful tool for monitoring machine utilisation and has some research application.

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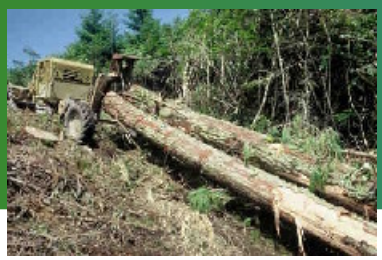

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Other work involves the conversion of hauler air controls to Danfoss hydraulic controllers, and the development of a Production Display Unit for entry/display of payload data (hauls, butts and pieces).

Further work will focus on alternative data capture tools such as on-board monitoring systems.

Uptake of Human Factors Research

Sophie Hide from COHFE gave a presentation on the second stage of the project, which involved interviewing industry members to assess their perceptions of the impact of implementation of previous human factors research, and to determine the reasons for the success or otherwise of past initiatives.

As a result of the specialist interviews the previous human factors research could be divided into 3 types: apparently successful initiatives; initiatives where further information is needed; and and initiatives that were apparently not successful. The successful initiatives included the adoption of various PPE, developments in training for a variety of work and self-care aspects, implementation of health and safety management systems by contractors, integrating hazard identification into all production processes, procedures for new workers, and a greater adoption of mechanisation, particularly in ground based operations.

Logging Technology Watch

The goals of this programme are: to improve technology transfer across the industry; to monitor overseas developments in technology; and to build a network of international research and collaboration with organisations such as CRC for Forestry, FP Innovations, and Skogforsk.

The FFR website at http://www.ffr.co.nz is up and running. This enables members of the Harvesting Theme to access all the LIRO brief reports, FFR Harvesting Technical Notes, Technology Watch and Theme Updates.

Regional Technical Meetings to promote the work in this Theme to harvesting contractors and forest company staff have started and more Technical Meetings are scheduled during the year.

One example of technology from outside forestry that is being investigated is the development of synthetic ropes (such as high modulus polyethylene, HMPE) that have higher maximum breaking load than wire rope for a fraction of the weight.

Another example of new technology being monitored is the application of robotics to forestry. Examples are the teleoperated “Besten” harvester in Sweden, remote controlled aircraft, and robotics in the mining industry.

Future Felling

Progress to date includes a literature review of steep country felling and bunching which showed productivity improvements from bunching on steep terrain, and the potential for use of a small walking excavator in felling on steep slopes.

Current work involves gathering shift level productivity and availability data from operations using bunching for hauler extraction.

Future work involves analysis of harvest plans and profiles over a sample of New Zealand cable logging conditions to determine the potential for bunching based on terrain, piece size and hauler payload. From the sample of harvest plans the objective is to determine what areas could have been bunched, and given the piece size and terrain, could stems be bunched to increase payload.

Other work planned includes:

- A study of Ross Wood’s safety winch-supported steep terrain bunching operation.

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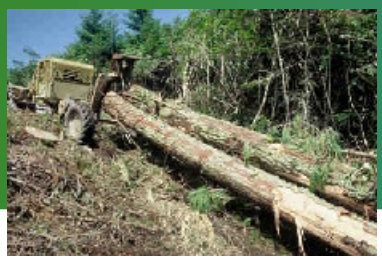

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Forest Industry Benchmarking

This project is aimed at developing a harvesting productivity benchmarking system against which the New Zealand forest industry can measure its performance.

The benchmarking system will provide a web-based system for FFR members to input harvesting production data on a confidential basis and generate baseline comparisons of various productivity and cost factors.

The system is being developed by the University of Canterbury School of Forestry and the project is headed up by Dr Rien Visser, Director of Studies in Forest Engineering.

Progress to date is that the input form has been developed, some initial data from the Benchmark Development Group has been entered (26 data points).

Next steps are to complete the web interface and then approach all Harvesting Theme members to collect data so give Rien your support when he calls to get your data.

OTHER HARVESTING RESEARCH

University of Canterbury School of Forestry

Dr Rien Visser, Director of Studies in Forest Engineering summarised some of the harvesting research currently underway at the School of Forestry.

Studies include:

- Felling (manual and mechanised)
- High-resolution imagery
- Improved road design
- Landing layout and size
- Radio-controlled chokers
- Landing biomass recovery

CNR Ivalsa: Forest Operations Research in Italy

Raffaele Spinelli of the National Research Council (CNR Ivalsa) in Siesto Fiorentino, Italy, gave an interesting overview of forestry in Italy and specifically the work of the Timber and Trees Institute.

Projects involve: harvester and processor performance: machine utilisation and analysis of delays; renewable energy and the performance of chippers; bundling and bulk transport; and short rotation coppice systems. Raffaele will be involved in the Biomass Recovery Project being run by the University of Canterbury.

CRC for Forestry – Harvesting and Operations

Mark Brown, Program Leader of the Harvesting and Operations Group (Programme 3) of the CRC for Forestry spoke about current harvesting operations research in Australia.

Research at CRC for Forestry is aimed at improving costs, energy use and emissions, value recovery, and safety.

Current projects include:

- Optimization in pine harvest with multifunctional harvester heads
- Onboard systems for forest operations (performance monitoring)
- Evaluation of alternative harvest systems including a productivity trial of 2 vs. 3 machine system on slopes over 20º
- Evaluation of economic use of forest operations biomass

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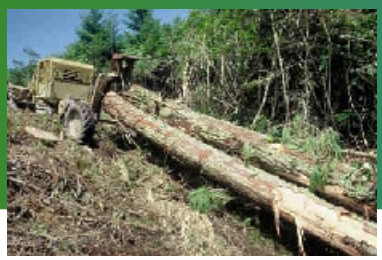

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- Evaluation of ground-based LiDAR for improved harvest planning
- Evaluation of transportation load efficiency through weigh bridge data
- Truck schedule optimization software

Research projects can be described as a mixture of cutting-edge trials (e.g. retrofitting harvesting equipment with hybrid technology, and new LIDAR applications); basic research (e.g. log measuring accuracy); applied research (e.g. comparison of harvester/processor and feller buncher applications in regrowth commercial thinning); and developmental research (e.g. the logging productivity and costing model: ALPACA).

Program Three (Harvesting and Operations) has recently released three bulletins:

- Impact of piece size and slope on productivity and costs of CTL harvesting equipment
- Best practice harvester calibration procedures
- The effect of tare weight on transportation efficiency in Australian forest operations
- Evaluation of the productivity and cost of an in-field chipping operation.

Prof. Glen Murphy from OSU has joined the CRC for Forestry programme for six months (from February) to help advance their work in the areas of value recovery and the use of new technology for detailed pre-harvest stand measurements.

FFR Harvesting Research Strategy

The third part of the Meeting aimed at presenting the Harvesting Research Strategy and the draft programme for 2009/10 and getting some input from members on other research ideas.

Keith Raymond presented the results of the Harvesting Research Strategy Workshop in July last year which captured members views on the future trends in the industry, research needs, gaps and priorities.

This Strategy development last July identified 5 major research areas on which the members wanted the Theme to focus:

- Productivity, Cost and Profitability
  - Benchmarking
  - Mechanisation of steep country
  - Profitable small forest harvesting
- People, Human Factors and Training
  - Best practice and training
  - Workforce characteristics
  - Contractor business management
- Value Extraction
  - Optimised mechanical processing
  - Centralised vs in-forest processing
  - Supply chain management
- Transportation and Logistics
  - Logistics Optimisation
  - Low cost road construction
  - Improved inventory systems
- Energy and the Environment
  - Integrated roundwood/biomass
  - Fuel efficient harvesting
  - Improved environmental planning

The highest priority programmes in order were:

1. Benchmarking
2. Mechanisation of steep country
3. Best practice and training
4. Optimised mechanical processing
5. Centralised vs in-forest processing

Draft 2009/10 FFR Harvesting Research Programme

The draft 2009/10 research work programme was then presented. This comprised project ideas that were internally generated by Scion researchers.

Each researcher in the Harvesting Theme gave a brief summary of the project idea: where it fits in the programme; what are the benefits; what the project entails; and what is the expected outcome.

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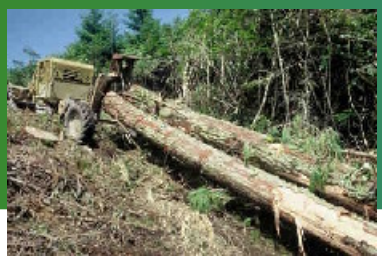

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The initial round of Project ideas covered 18 projects:

PROGRAMME ONE: Productivity, Cost and Profitability

- Automated Monitoring System Development
- Reducing Unproductive Hours
- Mechanised Harvester Data Capture and Application
- Benchmarking Cost and Productivity of Harvesting (and Transport?) Operations
- Mechanised Steep Country Harvesting Systems (including evaluation of the Menzi Muck/Spyder in New Zealand)
- Optimal Breaking Out Configurations

PROGRAMME TWO: People, Human Factors and Training

- Best Practice and Training for Cable Operations
- Optimising Work Load for Maximum Production / Value
- Improving Chainsaw Performance
- Improved Vision Systems for Harvesting
- Health and Safety of Crew Transport
- Addressing Musculoskeletal Disorders (MSD)

PROGRAMME THREE: Harvesting Technology Watch

- National / International Technical Study
- Application of Alternative Tools and Equipment
- Unleashing GPS Tracking on Logging Systems

PROGRAMME FOUR: Energy and the Environment

- Reduced Moisture Content Harvesting
- Impact of Riparian Zones on Productivity

Discussion of Research Project Ideas

This draft Programme was circulated to all Harvesting Theme members and a call for other Projects of interest to the industry had been made.

Members then broke out into discussion groups to critique the ideas presented and to provide the opportunity to propose further Research Projects to add to the Programme.

Further work involving consolidation and refocusing of project ideas, with some direction from the industry Technical Steering Team will be done over the coming weeks.

Once approved by the Board, the final draft Research Programme will be circulated to all members.

Forestry Field Trip

On Day 2, a field trip was hosted by PF Olsen Ltd to contractor Ian Harvey's operation (FPNZ 11) in Manawahe Forest.

The focus of the trip was innovative harvesting operations.

The operation was a swing yarder with mechanised processing (Woodsman Processor) and off road trucking.

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