



HARVESTING PROGRAMME UPDATE

Issue Number: 21

Date: Feb 2015

Programme Manager: Keith Raymond

Summary

This programme update highlights a second industry-wide research forum to seek further industry input to new harvesting and logistics research, scheduled for South Island industry members in March. Progress in the PGP steep land harvesting programme to end of Quarter 2, 2014/15 is reviewed. The successful in-field demonstration of the Koller K602H cable yarder demo at Mangatu Forest earlier in February is also featured along with the first look at a brand new swing yarder, the Log Champ 550 from T-Mar Industries Ltd in Campbell River, British Columbia. The focus of the programme has been on continuing engineering developments in the teleoperation, grapple control and innovative yarding system projects.

HARVESTING RESEARCH WORKSHOPS

A strategic workshop forum to identify the industry's priorities for new harvesting and logistics research was held on Wednesday, 26th November 2014 in Rotorua. About 70 industry members attended and gave their input at the workshop sessions.

With the current PGP Steep Land Harvesting programme coming to an end in less than two years' time (June 2016) it is timely to begin discussions across the industry on what happens beyond the end of this programme.

Two wider forestry reviews in 2014, the Independent Forestry Safety Review (IFSR) and the review of the NZ Forestry Science and Innovation Plan have helped to identify potential areas for further research in the harvesting and logistics area.

The strategic forum in Rotorua discussed:

- Current Industry Issues and Future Trends
- Industry Needs and Gaps
- Future Research Ideas
- Research Priorities

If you would like a summary of the outputs of the workshop forum please contact Keith Raymond by email at keith.raymond@ffr.co.nz or phone 027 4385233.

A second research forum to seek wider industry input to new harvesting and logistics research is scheduled for South Island industry members in **Balclutha on Wed 18th March, 2015**. This forum is organised in conjunction with the Southern Wood Council and NZFOA. To register for this event please contact Southern Wood Council: Phone (03) 470 1903 or email: Caroline.rickerby@fiea.org.nz

After the results of this second Harvesting and Logistics Research Forum are analysed FOA/FFR will work towards developing research funding bids.

RESEARCH PROGRESS: Q2 2014/15

FFR's Harvesting Programme has completed the second quarter of the year to 31 December, 2014. Progress in the 2014/15 Research Plan was presented at the Technical Steering Team Meeting on Wed 18th February, 2015 in Rotorua.

1.1 Steep Slope Feller Buncher

Implementation of the HarvestNav software application (Figure 1) has continued during the quarter and extension to the wider forest industry was made at the Harvesting Forum in November. So far 26 licences have been issued, and seven units implemented across the industry.



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Planned enhancements include: integration with mobile in-field communications; ability to handle external GPS sensors to monitor all machines and crew positions on-screen; and integration of external tilt sensors for self-levelling machines. Version 1.5 of HarvestNav is available as a free download from the Interpine Forestry website or click here to download:

<http://www.interpine.co.nz>.

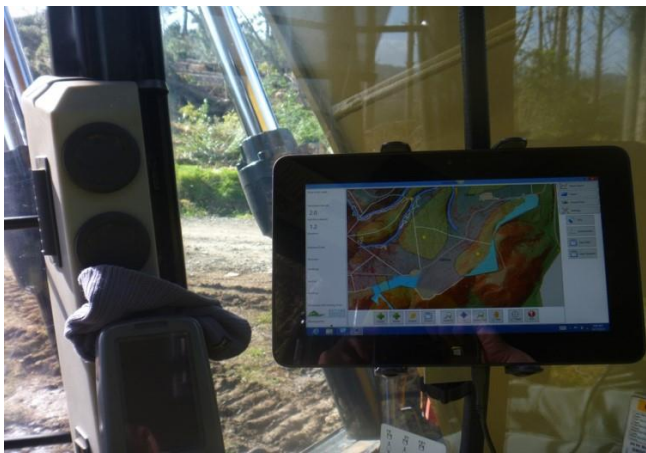


Figure 1: HarvestNav on-board navigation system

1.2 Teleoperated Felling Machine

In Task A of the teleoperation project, initial tests of remote control of a John Deere 909 feller buncher, owned by Ross Wood of Wood Contracting Nelson Limited, were undertaken in early July, 2014 (Figure 2).



Figure 2: Field test of remote control of Ross Wood's John Deere 909 feller buncher

Stage 1 of this part of the teleoperation project, to trial the remote control system has been

achieved. The next stage of the project is to introduce video and audio feedback to the operator, and the final phase is to operate the machine from a distance, such as an operator cab on the landing. This is an exciting development for the programme and has attracted a lot of media interest.

In the other parts to the teleoperation project, University of Canterbury Mechatronics researcher Bart Milne has a plan to retrofit a teleoperation control system to a converted excavator loader (Volvo EC290).

In Task B of the teleoperation project, Scion researcher Dr Richard Parker is working with UC Mechatronics researcher Chris Meaclem in the further development of the prototype lightweight semi-autonomous tree-to-tree felling machine ("Stick Insect").

2.1 Advanced Hauler Vision System

Extension of the CutoverCam hauler vision system (Figure 3) to the forest industry was undertaken at the Harvesting Forum in November.



Figure 3: CutoverCam in action



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If you would like an in-field demonstration of the CutoverCam system please contact Paul Milliken at Cutover Systems Ltd (Phone 07 349 4189 or email Paul at info@cutoversystems.com).

In another study, a Technical Note on the application of a grapple camera system to a hauler operation to enable “after dark” logging operations was published in October (Technical Note HTN07-02).

2.2 Improved Grapple Control

In the Cable Rigging Efficiency project, UC Forestry graduate student Hunter Harrill has completed his PhD thesis on different cable rigging configurations and a literature review of cable logging has been published as a Technical Report (Report No. H019). In the last phase of this project Hunter measured cable tensions of 8 different operations (3 motorised grapple carriage operations, 3 North Bend operations and two Acme motorised slackpulling carriage operations). A Technical Report has been completed and will be published shortly.

Further development work has continued on the dual-arm Scorpion grapple carriage. The alpha prototype grapple and control system has now been built and was field tested over the Christmas break. Further modifications are required and the next field test is scheduled for March, 2015.

In the Felling Wedge project, aimed at improving directional felling of manually-felled trees for better grapple extraction, a new felling wedge has been developed. The Jackson Beckham felling wedge, designed and developed by Dan Jackson and Mike Beckham of Whangarei, has been tested during initial field trials and a report has been completed (Report No. H018).

2.3 Innovative Yarding System

Development has continued on the alpha prototype mobile tail hold carriage, and self-propelled grapple carriage (1/8 scale working

models). A technical and economic feasibility analysis was published in October (Technical Note HTN07-01). The revised Development Plan for the Innovative Yarding System was approved by the Programme Steering Group in November, prioritising work on these two carriages.

Construction of the 1/8 scale working model of the mobile tail hold carriage is now complete, and the set up and operation of the alpha prototype tail hold carriage was demonstrated to the TST in Gisborne in early February.

3.2 Benchmarking Cost and Productivity and Harvesting Technology Watch

Work has commenced on data collection of 2014 harvest areas for the Benchmarking project. So far only 60 data entries have been received and the close off for 2014 data collection is end of March. Please contact Rien Visser at rien.visser@canterbury.ac.nz if you have harvest area data available for input to the Benchmarking database. A Technical Note will be completed prepared in May, 2015.

A report on the integration of GPS/GNSS data with grapple harvester production data to provide opportunities for improved forest management has been completed (Report No. H017). A brief Technical Note on the use of data captured from modern harvester heads using the StanForD protocol integrated with geospatial information for practical applications such as machine productivity assessment and machine navigation for the operator has also been published (Technical Note HTN07-03).

If you or any of your harvesting contractors are recording production data from a grapple harvester and would like to be part of this project, please contact Alejandro Olivera Farias at University of Canterbury School of Forestry: alejandro.oliverafarias@pg.canterbury.ac.nz

The project on Fuel Use in New Zealand harvesting operations is continuing. Actual fuel use data is being collected from participating logging contractors and analysed to better understand the drivers of fuel use of different



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harvesting machines and systems to help make operations more cost effective. If you or any of your logging contractors would like to be part of this fuel use study, please contact Paul Oyier, Master of Forestry Science student at the University of Canterbury, School of Forestry at paul.oyier@pg.canterbury.ac.nz.

KOLLER K602H CABLE YARDER DEMO

FFR members and their contractors were invited to an in-field demonstration of the Koller K602H cable yarder demo at Mangatu Forest near Gisborne on Wednesday, 4th February 2015.

This remote controlled yarder has recently been imported to NZ from Austria. About 70 industry members attended the field day and a report on the working demonstration of the Koller yarder will feature in the March issue of the New Zealand Logger magazine.

HARVESTING INDUSTRY MEETING

George Lambert, President of T-Mar Industries Ltd in Campbell River, British Columbia was the guest speaker at an FFR Harvesting Industry Meeting in Rotorua on Wednesday, 11th February 2015.

T-MAR Industries has recently introduced a new swing yarder to the logging industry, the Log Champ 550 yarder, which is the only all-new grapple yarder to be designed and built in nearly twenty years.

The first ever Log Champ 550 made in Campbell River, B.C. and valued at \$CDN 1.3 million, rolled out to its new owner on Oct 22, 2014. T-MAR expects to make 3-4 yarders per year for the next 15-20 years as the design evolves.

George Lambert presented information about T-Mar Industries and the Log Champ 550 swing yarder to a group of about 25 industry people at the meeting. The Log Champ 550 also recently featured in the Logging and Sawmilling Journal (Figure 4). If you would like a copy of this article please contact Keith Raymond at keith.raymond@ffr.co.nz.

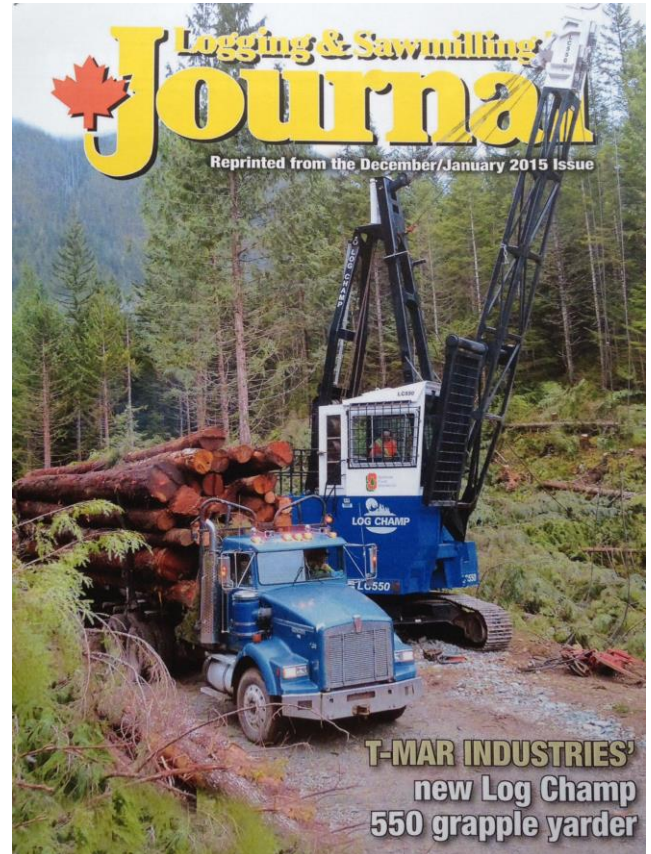


Figure 4: Article on the Log Champ 550 swing yarder

RESEARCH OUTPUTS TO Q2

The following is a list of research reports published this Quarter:

Technical Reports:

- Report H017: Integration of GNSS in harvesters as a tool for site-specific management in plantation forests – A. Olivera, R. Visser, J. Morgenroth and M. Acuna.
- Report H018: Development of the Jackson Beckham Felling Wedge for Directional Tree Felling – B. Vincent, D. Jackson and M. Beckham.
- Report H019: A Review of Cable Logging Literature – H. Harrill, R. Visser.



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Harvesting Technical Notes:

- Harvesting Technical Note HTN07-01: Innovative Yarding System: Technical and Economic Feasibility – S. Hill.
- Harvesting Technical Note HTN07-02: Logging after dark with an Alpine Grapple Carriage fitted with lights – S. Hill.
- Harvesting Technical Note HTN07-03: Integration of harvester data and geospatial information – A. Olivera and R. Visser.

These reports are now available to members on the FFR website: <http://www.ffr.co.nz/>.