Harvester Simulator Training

Summary

TECHNOLOGY WATCH is a report outlining research and technology developments that are occurring outside the FGR Harvesting Programme. This report presents details of Riveria Vocational Education & Training (formerly Valtimo Forestry College) in North Karelia, Finland and describes the training systems used, such as forest machine simulators, which have been used in Scandinavian countries for many years to train forest machine operators. In addition, information is presented on the Waratah Simulator Workshop held in Melton, Victoria. The objective was to review the Mechanised Harvesting Operator Training System. The potential to use these simulators in New Zealand is only starting to be realised as a way to improve the training of machine operators.

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INTRODUCTION

Scandinavia is recognised as the powerhouse of the forest industry worldwide. Scandinavia currently harvests approx. 150 million m^3 per annum with a relatively small workforce. Their training systems have evolved over many years, are systematic, data driven and proven. Forest machine operators are trained for a minimum of two years to a professional standard based on forest industry standards objectively monitored and measured through data driven metrics. The John Deere TimberSkills software / cloud based training programme provides an independent training mechanism to professionally train operators to a consistently high standard.

There is a recognised lack of trained harvester / processor operators and a range of skillsets across the machine operator workforce in the New Zealand forest Industry. There is no consistent or systematic training programme that delivers professionally trained forest machine operators to the forest industry.

There is however no need to "reinvent the wheel" in establishing training for machine operators in New Zealand. The forest machine operator programme delivered at Riveria Vocational Education & Training (formerly Valtimo Forestry College), North Karelia, Finland is recognised as being one of the best in the world.

The New Zealand forest industry has the opportunity to replicate this training regime from Valtimo Forestry College to train professional forest machine operators to the same high standard. The

immediate benefits to the NZ forest industry would be a standardised machine operator programme, a steady flow of trained machine operators, and ultimately increased value recovery from our forest harvesting operations.

RIVERIA VOCATIONAL EDUCATION AND TRAINING

Riveria Vocational Education & Training in North Karelia, Finland is an education organisation whose main function is to provide qualified vocational education.

Vocational Forestry College Valtimo delivers vocational qualifications for harvester, forwarder and excavator operators (among other qualifications). The centre has a staff of 40, 250 students, 30 forestry machines, 4 log trucks and 4 excavators, 25 simulators (mechanical and virtual) and an annual turnover of €4.5 million (NZD 7.6 million). The College has provided education and training to 3,000 Finnish and 2,000 foreign students.

During August 2018 James Broadley travelled to Finland to review the current vocational qualifications and training delivery for mechanised harvesting operators with a view to replicating the training system from Riveria in New Zealand.

During this time, James:
- Met with Mikko Saarimaa, Education Manager Valtimo forestry College – discussed the Machine Operator training scheme

- Attended a Valtimo Forestry College (Riveria) and John Deere TimberSkills workshop.

- Met with John Deere Technical staff/software programmers to discuss whether changes can be made to mechanised harvesting training software for use in New Zealand – software would include :
  - o TimberSkills
  - o Terrain Editor
  - o Timbermatic/Timberite H-16 PCsim

- Options of modifying the John Deere TimberSkills/Terrain Editor software suite were discussed to make this more appropriate for New Zealand's tree species, tree size and growth characteristics allowing the simulators to process New Zealand log market customer specific log specifications.

- Met with the Ponsse Training Manager, Harri Savonen – and discussed Ponsse simulator training opportunities.

- Attended FinnMETKO forestry harvesting machine exhibition and demonstration.

INFORMATION UPTAKE FROM RIVERIA

The following information was gathered from the visit to Riveria for development of a Mechanised Forest Machine Operator Training System:

- Interrogation of Riveria Machine Operator recruitment and training programme.

- Programme outline and timelines, training materials, delivery and assessment methods.

- Programme timelines and flexible student accelerated progression

- The Static Simulator Training facilities and programme (see Figures 1-3).

- Current training and machine operation technologies being trialed and/or developed at Riveria (Valtimo Forestry College)

- Forest Machine Operator performance measurement and support programme

- Industry wide knowledge and acceptance of the StanForD data standard.

Figure 1: Simulator training room – Riveria

Figure 2: Static Simulator (Forwarder) – Riveria

Figure 3: Static Simulator "control tower" - Riveria

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POSSIBLE FUTURE DEVELOPMENT IN NEW ZEALAND

- Future harvesting machine operator technologies currently being investigated at Riveria (Valtimo Forestry College)

- Investigated the possibly of a student and tutor exchange programme between the two institutions to foster knowledge/experience sharing

- Potential to work closely with the Division head and machine operator trainer, Mikko Saarimaa to transfer knowledge from the Finnish system to New Zealand.

Figure 4: Harvester getting serviced in the workshop at Riveria

Figure 5: Workshop (left) and Static Simulator training field (background) at Riveria

Figure 6: In the "Control room" looking out at the Static Simulator training park
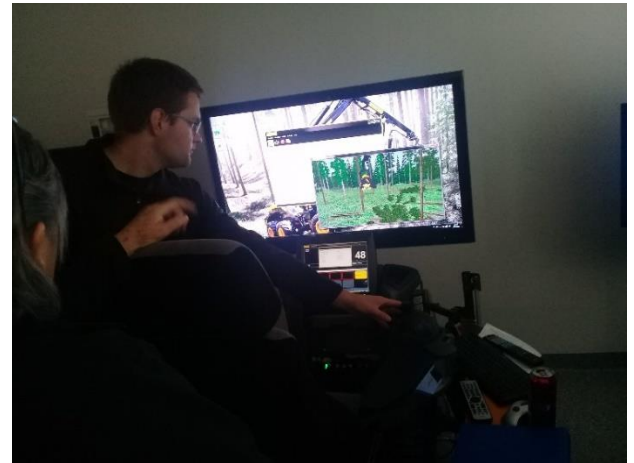
Figure 7: Cut To Length (CTL) simulator at Riveria

Figure 8: Demonstration of Ponsse laptop simulator at FinnMETKO exhibition

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WARATAH SIMULATOR WORKSHOP

In 2018 Waratah Asia Pacific & Africa sponsored James Broadley to attend the Waratah Simulator Workshop in Melton, Victoria.

Information covered in the workshop included:

- John Deere TimberSkills web interface (Figure 9)

- John Deere Terrain Editor

- Experience with Waratah VR (Virtual Reality) simulator (Figure 10)

- Control Measurement and Calibration training exercise using digital calipers (Figure 11 & 12).

Figure 10: Simulator training with Virtual Reality (VR) technology – Waratah Simulator Workshop

Figure 9: Using TimberSkills training package on the John Deere Cut To Length simulator
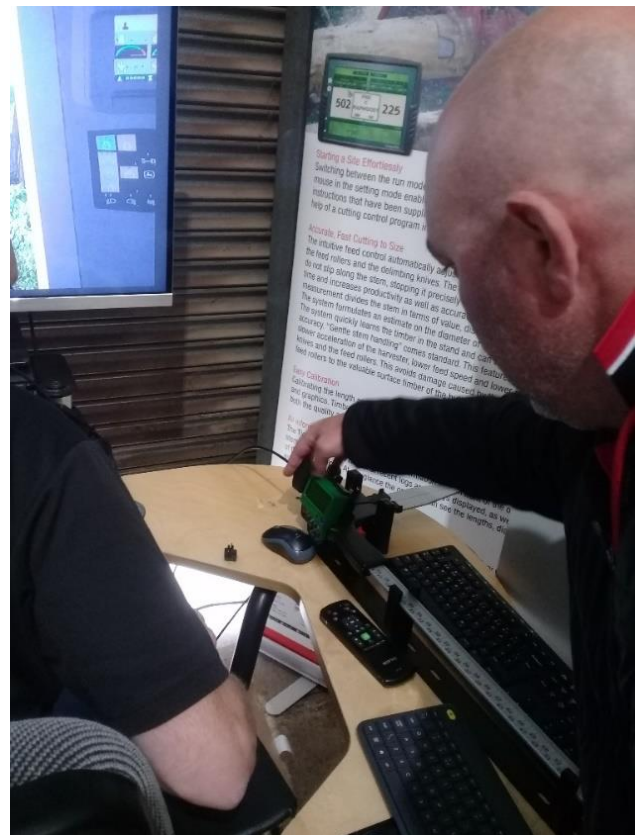
Figure 11: Haglof Calliper and docking station – Control Measurement exercise in conjunction with simulator – Waratah Simulator Workshop

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Figure 12: Calibration and Control Measurement exercise

PROGRESS TO DATE

An informal advisory committee consisting of forest companies, consultants and machinery manufacturers has been established to create a pathway to mechanised harvester/processor operating training and standards. The group is comprised of the following forest companies, manufacturers, consultants and education providers:

- Hancock Forest Management (NZ) Ltd
- Rayonier Matariki Forests
- Timberlands Limited
- Wenita Forest Products Ltd
- John Deere Inc.
- Waratah NZ Ltd
- WoodsmanPro
- Satco
- Southstar Equipment Ltd
- ForestPHD
- Interpine Innovation

RECOMMENDATIONS FOR NEW ZEALAND

- Determine what the mechanised harvesting operator of the future will look like? What skills will he/she need to operate the mechanised harvester/processor of the future?

- A standardised machine operator training scheme for the NZ forest industry based on the Riveria (Valtimo Forestry College) model.

- John Deere Timberskills training programme – it's applicability to New Zealand forest industry and any software modifications needed to adapt the training skills for tree length harvesting and tracked harvesters/processor machines.

- Build a specialized machine operator training school that models current training practices used in Scandinavia – simulators, static simulators, machine operation.

- The specialized machine operator training school should be very closely aligned and/or managed by the NZ forest industry and should be directed by experienced and technically advanced ex machine Pro Operators.

- Training of a range of different harvesting head software such as John Deere/Waratah, WoodsmanPro, Southstar Equipment, Satco and other harvesting/processing head manufacturers.

- Use of Virtual and Augmented Reality (VR and AR) and simulator networking technologies to enhance the training of machine operators and allow the interaction of different "machines" to simulate an actual work environment.

- An accompanying training programme for operational managers (NZ Diploma in Forest Management graduates).

REFERENCES
Broadley, J. (2018): Proposal for Forest Growers Research funds to visit Riveria Vocational Education & Training (formerly Valtimo Forestry College) North Karelia, Finland to review/implement Mechanised Harvesting Operator Training System. Prepared by James Broadley, Rotorua. 31 July 2018.