



HARVESTING TECHNOLOGY WATCH

HTW-12
October 2013

Summary

Elmia Wood 2013, the world's largest forestry machinery exposition, was held near Jonkoping in southern Sweden from 5-8 June 2013. This issue of Harvesting Technology Watch presents the highlights of new technology developments seen at the show, in terms of equipment that may have application to New Zealand logging contractors and forest companies. A group of New Zealand forest managers and contractors went to Elmia Wood prior to a field trip organised by Dr Rien Visser of the University of Canterbury, which included visits to logging operations in southern Germany and Austria. The machinery show and demonstrations at Elmia Wood aim to showcase new technology and innovations in the forest. There were over 500 exhibitors and over 50,000 visitors to the show. The following highlights were selected by the New Zealand trip participants and were only a small sample of the equipment that was demonstrated at Elmia Wood 2013.

Keith Raymond, Future Forests Research

NEW LOGGING TECHNOLOGY

Koller Cable Yarders

Koller Forsttechnik is a cable yarder manufacturer which has been building yarders and carriages in Kufstein, Austria for more than 50 years. The machine on display at Elmia Wood 2013 was a Koller K507 Mountain Harvester which is the third largest in their range of remote control, semi-automated cable yarders. It is a 13.5 m (45-foot) tower mounted on a 358kW (480 hp) 6 x 8 MAN truck equipped with a Penz processor crane and a Woody 60 processor head. Total weight on a four-axle truck is 35.0 tonnes.

The yarder runs a Koller MSK-3 slack pulling carriage, and is designed for both uphill and downhill yarding. It is fully radio-controlled by the Koller MultiMatik KMM remote control unit. This unit controls the truck engine to optimise performance of the winches, the carriage, engine fuel consumption, and the automatic return of the carriage from the landing back to the breakout site. This enables a cable yarding operation to be run with a three-man crew (one processor operator also controlling the yarder and unhooking, one breaker out and one tree faller).

The Koller range of remote control cable yarders also includes the larger K602 and the K702 yarders. The K702 is the most powerful Koller yarder, using a 160kW 6-cylinder Cummins diesel engine and John Deere six-speed power shift

transmission to provide 12 tonnes-force of skyline line pull and 8 tonnes-force of line pull for the main and tail rope winches. The drums carry 600 m of 25-mm (1") swaged skyline and 900 m of 14-mm (9/16") swaged main and tail rope. Line speeds for main and tail drums are quoted at 11 m/sec.



Figure 1: Koller K507 Cable Yarder



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More information is available on the Koller website (www.kollergmbh.com) or email Roland Fürst at roland.fuerst@kollergmbh.com.

Konrad Mounty 4000 Skyline Yarder

Another small European yarder demonstrated was the Mounty 4000 manufactured by KonradForsttechnikGmbH from Austria, the same company that manufactures the Highlander 6-wheel drive clambunk harvester. The yarder has a 13.5 m (45-foot) tower mounted on a MAN 6 x 4 360 hp truck.

It has the processor crane integrated with the yarder tower to provide a 240-degree working circle. The innovative operator cabin has a quick opening door at the front for quick exit to release the chokers of the inhauled drag. In automatic mode the cab door closes when the operator sits down on the seat. A larger Mounty 5000 is also available from Konrad.



Figure 2: Konrad Mounty 4000 yarder with Woodliner self-propelled carriage

The Mounty yarder range runs the Woodliner 3000 motorised carriage which uses a 73-kW diesel engine powering a dual wheel drive system. It operates on a 22-mm diameter skyline and does not require a tail rope for outhaul. It features radio control and automatic return to the breakout site and the drop line can operate during the carriage out haul function. It is suitable for uphill extraction but is particularly suitable for downhill yarding in small wood.

The carriage has 80 m of 12-mm mainline with maximum pulling force of 30 kN (2.9 tonnes) with fast driving speed, up to 6.0 m/sec. The carriage weighs 1170 kg.

More information is available on the Konrad website www.forsttechnik.at or email Markus Konrad at markus.konrad@forsttechnik.at.

FiberDrive Quick Release Attachment System

One amazing innovation seen at Elmia Wood 2013 was the Fiberdrive Quick Coupler attachment system for rapid switching from grapple to processor head. The unit was mounted on an SP Maskiner SP 561 LF harvester head, and the operator changed from the processor head to a grapple in seconds without leaving the operator cab.

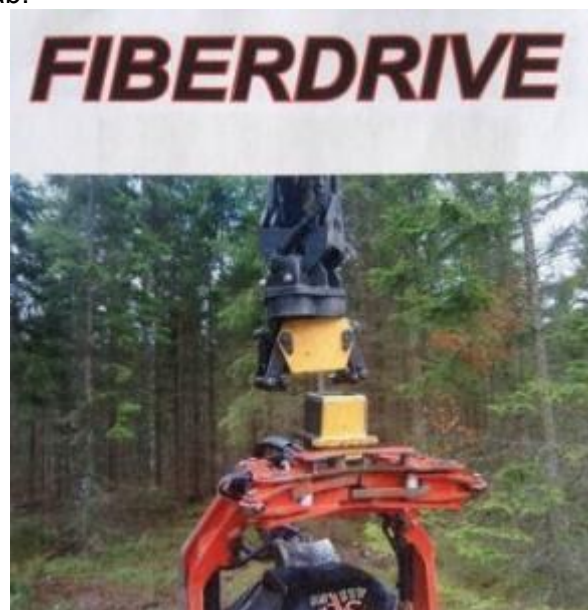


Figure 3: Fiberdrive Quick Coupler attachment



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The system is a hydraulically braked link with a robust rotator (1800 Nm torque) with eight hydraulic connectors, and one electrical contact for power supply. Power supply is via quick release built into the mount. The hydraulic hoses are mounted in the centre of the rotator, allowing rotation of 450 degrees. It features wireless transmission of hydraulic set up information from the machine to the harvester head. The system weighs 230 kg and can handle a maximum attachment weight of 2200 kg. It fits all rotators and is easy to install.

Benefits are that all logging tasks (processing, loading, forwarding etc.) can be done with one machine. The speed of changeover from one function to the next was impressive without having to use a mechanic or leave the operator cab.

The unit is manufactured by FiberpacAB in Vislanda, close to Växjö in southern Sweden, and is commercially available. More information is available from Jan Carlsson at Fiberpac AB, Bäckåkra SE-340 15 Vittaryd, Sweden, or email info@fiberpac.se.

Eco-Forst T-Winch Mobile Traction Winch

Normally a traction winch is mounted on the machine that needs to use it – such as a harvester or a forwarder. When required, the wire rope cable is unwound and attached to a tree to secure the machine while it crawls up or down the slope. The disadvantages include the weight of the winch that is carried around even when the winch is not needed; the winch can only be used for the machine on which it is mounted; and it is restricted to short distances.

The solution is a self-propelled tracked winch that is guided by remote control to the place where it is needed. EcoForst GmbH, an Austrian company has designed a remote-controlled mobile tracked winch, called the T-Winch, for use in a tethered machine system.

The T-winch is driven remotely and tethered to a tree or stump. Once tethered, the blade at the front

is dropped and the winch rope, which runs from the winch at the rear between the tracks and out the integral fairlead on the blade at the front, is connected to the forestry machine as required. Lengths of up to 500 m of 18-mm diameter cable are possible. The cost of the unit is approximately EUR 100,000 (\$160,000NZ).



Figure 4: Eco-Forst T-Winch Mobile Traction Winch

This concept has multiple advantages. The tracked mobile winch can be used with any machine and is not limited by the power of the carrier vehicle. The forestry machine carries less weight and is not restricted by the deployed winch cable. Safety is also enhanced by remote control and additional brakes independent of the forestry machine (including the blade on the front of the T-Winch).

The first version of the T-Winch has been used in Austria for 18 months, and later in 2013 Eco-Forst will release a version with a larger cable drum. A video clip is viewable on YouTube (<https://www.youtube.com/watch?v=9hWoEi3NbR8>) and more information on the T-Winch is available on from the ecoForst website www.ecoforst.at.

Herzog Alpine Synchronwinch

Another traction winch for a tethered machine system seen was the Alpine Synchronwinch, manufactured by Herzog Forsttechnik AG of Zumholz, Switzerland.



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The Alpine Synchronwinch is mounted on either a forwarder or a harvester. The winch carries 280 m of 15-mm diameter cable and the operation is radio remote-controlled. The speed and force adjustment is continuously variable from 0-10 tonnes-force, thereby maintaining constant tensile force on all cable systems. There is a tension meter in the operator cab showing the actual tensile force of the winch.

There are two cameras in the system, one rear view camera and one monitoring the spooling of the winch rope on the drum. The camera display shows the image of the reversing camera and/or the winch observation camera. There is also an option to have two monitor screens in the cab.

The system features synchronised electronic regulation of both winch-drive and wheel drive. This provides automatic gear shift and regulation of the steering mechanism of the winch while driving. The winch drive is hydrostatic, with additional embedded planetary gear unit with integrated spring loaded fail-safe brake.



Figure 5: Alpine Synchronwinch mounted on a harvester

In the harvester, the winch is mounted on the front of the engine frame. Dimensions are 810 mm length, 1600 mm width and 1450 mm height. The weight of the winch is about 1950 kg including mounting fabrication materials. The installation of the winch on the harvester base machine is made with a quick release adapter. Using this adapter,

the traction winch can be installed and removed with only a few actions in a short time. This also means that the winch can be swapped between harvester machines.

In the forwarder the winch is mounted on the rear frame between the wheels. Dimensions are 1870 mm length, 810 mm wide and 640 mm height. The weight of the winch is about 1700 kg including mounting fabrication materials.



Figure 6: Alpine Synchronwinch mounted on a forwarder

Cost for the winch package (complete including electronic control, radio, not including installation) is about 60,000 EUR (\$100,000NZ).

Herzog have supplied 17 Alpine Synchronwinch units for forwarders since 2008, and 10 Alpine Synchronwinch units for harvesters since 2010, mainly into Germany. More information is available from Klaus Herzog at www.herzog-forsttechnik.ch or email info@h-ft.ch.

Optea Forest Falcon Head Up Display

The Optea Forest Falcon is a transparent head up display system that presents data from the harvester to the operator without requiring them to look away from the usual viewpoint.

The system comprises a projector unit mounted in front of the windscreen, and a combiner



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(transparent film mounted at eye level). It is based on the Digital Light Processing (DLP) technology developed by Texas Instruments and used in many front projectors today. It gives a clear sharp image of whatever Graphical User Interface is required to be displayed. The system connects straight to the control system of the harvester and is interfaced either with a keypad or an intuitive PC application (on a PC tablet). It receives VGA or HDMI inputs and is controlled through Bluetooth, RS232 or Canbus.



Figure 7: Optea Forest Falcon head up display

The benefit of this system is that it will allow the machine operator to stay focused on the work while at the same time being able to read the tree measurements or instructions or warnings that need to be displayed.

The Optea Forest Falcon is simple to retrofit to existing machinery. It requires no maintenance or advanced training but it does require care to ensure that the operator does not touch or tear the screen. More information is available on the Optea website (www.optea.com) or email at sales@optea.com.

Automatic Seat Levellers

Operators of harvesting machines on steep slopes sitting in leaning positions are exposed to static stresses leading to musculoskeletal disorders in arms, shoulders and spine. Automatic levelling of the operator's seat in the harvesting machine is an efficient way of improving the operating environment, improving health and wellbeing and

minimising the risk of musculoskeletal disorders of the operator

Using an automatic seat leveler such as the Herzog seat tilt plate creates an ergonomically less tiring seat position for the operator, and allows more concentrated and effective work even on steep slopes. The Hydraulic seat tilt plate is installed between the operator's seat and the cab floor. It is tiltable up to 20 degrees and is operated with electrical controls on the driver's seat.



Figure 8: Herzog seat tilt plate

The equipment package consists of the seat tilt plate and a hydraulic valve to be installed on the underside of the cabin floor. To connect the hydraulic valve with the adjusting cylinder, two holes have to be bored into the cabin floor. Hydraulic pressure for the adjusting cylinder is a maximum of 30 bar for safety reasons. Installation takes approximately 6-8 hours.

Price of the Herzog seat tilt plate package is (not including freight or mounting): EUR 2,150 (\$3,450 NZD) plus freight. Mounting costs approximately EUR 500 (\$800 NZD). Additional equipment required includes hoses, cables and brackets (worth about EUR 80 (\$130 NZD)). More information is available from Klaus Herzog at www.herzog-forsttechnik.ch or email info@h-ft.ch.

Haglöf Log Tagging System

A system for log tracking through the supply chain was provided by Haglöf, a Swedish company well



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known for log inventory equipment. Log data gained from the Digitech Professional electronic calipers (such as species, log grade, log diameter etc.) and time/date stamping can be recorded against the barcode. The second part of the system comprises a manual log tagging system using a hammer and a magazine loaded with plastic tags which are linked to the data logger information.

The barcode tags are attached to each log using a hammer loaded with a tag from the magazine (holding up to 40 tags) and attached to the log with a light swing of the hammer against the log end. The cost of tags was reported to be \$0.17-0.20 NZD per tag, depending on order size.



Figure 9: Log tag to link data from Haglöf Digitech Professional electronic calipers

The barcodes can be read by any barcode scanner with wireless communication. Linked to the PC-based Logscale system, source ID such as harvest areas, location, and payment information (loggers, scalers, transport contractors etc.) can be linked in a computer database.

More information is available on the Haglöf website www.haglofsweden.com or email Patrick Lidström at patrick.lidstrom@haglofsweden.com

Ludwig Giritzer Radio Controlled Chokers

Radio-controlled chokers are efficient because there is no time-consuming release of chokers on the landing. They are practical systems because

they also work when the conditions are difficult. The system is reliable under adverse conditions of water, mud and snow.

The weight per choker is 1.6 kg and they can be used on strops of maximum 13 mm rope diameter. They are released at the push of the button and there is no hazard as the system has a mechanical lockout.



Figure 10: Ludwig Giritzer electronic choker

The system operates on radio frequency of 433.92 MHz and the range of the remote control is 30 m.

The Ludwig Giritzer radio-controlled choker system includes: four chokers (maximum eight); one remote control, a set of installation tools, four spare batteries and a set of mechanic's tools.

More information is available on the Ludwig Giritzer System website:

<http://www.ludwigsystem.com> or email Peter Ruf at peteruf@mac.com or telephone: +49 8651 7688470.

Hand Held Log Stack Measuring Device

A project at the University of West Hungary's Department of Wood Sciences Innovation Center is aimed at developing a new and fast way of measuring solid cubic metre volume of stacked wood. This project uses a photo-analytical method of measuring small diameter wood assortments in the stack. The accuracy of the new photo-



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analytical method is claimed to be significantly higher than that of the traditional method.

The handheld log stack measuring device features a camera with a resolution of up to 20 megapixels plus a laser that measures the distance between the camera and the object being photographed.



Figure 11: Dr Pásztor Zoltán of the University of West Hungary demonstrates the log stack measuring device.

The user photographs the end of a stack of logs and then inputs the distance from the viewpoint to the log stack to get the right scale so the size of the pixels can be determined. Using image processing, the pixels are then classified to obtain an accurate reading of the proportion of the pixels showing the log ends, and hence the butt diameter of the logs. The battery has a six to eight hour charge and since the device is hand-held it is highly portable.

Dr Pásztor Zoltán of the University of West Hungary's Innovation Center developed the stack-measuring device. More information is available on

the University of West Hungary's Department of Wood Sciences website <http://www.fmk.nyme.hu> or email Dr Pásztor Zoltán at pasztory@fmk.nyme.hu.

Sauer Danfoss PVX Hydraulic Control Valve

Sauer Danfoss has developed a hydraulic valve that reduces forwarder fuel consumption by 13 to 20 percent. A Sauer Danfoss development project began in 2004 to create an intelligent hydraulic proportional control valve that does not reduce power output but delivers precisely the right oil pressure all the time.

A normal hydraulic valve cuts off the flow of hydraulic fluid to create the correct pressure, for instance to manoeuvre a crane. The result is that a lot of power is consumed to no benefit. Sauer Danfoss has simplified the valve, partly by eliminating the pressure compensator, and by using electronics and sensors to monitor the pressure so that the valve can constantly supply precisely the output that is needed.

Now ready for the market, the valve is called PVX and had its world premiere at Elmia Wood 2013. Forest machine manufacturer Gremo is the first to use the valve, mounted on the Gremo 1050 forwarder. Gremo has done the field testing. The results show that fuel consumption is reduced by as much as 20 percent during crane work and by 13 to 15 percent for the forwarder operational cycle as a whole. The valve system will later be made available to all forest machinery manufacturers, and other industries.

For more information contact Sauer Danfoss development manager David Stålgren at Sauer-Danfoss GmbH & Co. OHG or e-mail: offinfo@sauer-danfoss.com.

Fogmaker Fire Suppression System

Fogmaker International AB of Sweden have developed a watermist-based fire extinguisher system with high pressure (100 bar) that functions like a piston accumulator, for all engine rooms and



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enclosed spaces. Water mist under high pressure is a superior fire fighting medium in engine compartments. The water mist also includes an addition of foam that lays a cover over inflammable oil products that tend to collect in engine trays.

Fogmaker has developed a new triple extinguisher system with a range of 3.3, 4.0, 6.5 or 7.8-litre cylinders. The cost of the system is about NZ \$7,000 which compares very well with other fire suppression systems.

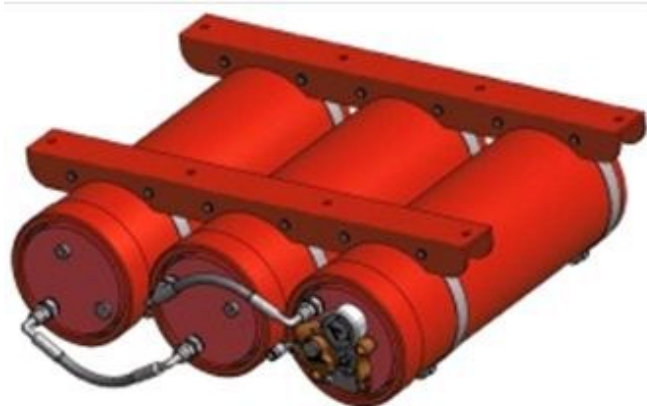


Figure 12: Fogmaker triple extinguisher fire suppression system.

Fogmaker International AB have a distributor in Australia: Fogmaker Australia Pty. Ltd., P.O. Box 47, Greta, N.S.W. 2334. Telephone 1800 424 889 or +61-2-4932 3644. For more information contact Fogmaker International AB, Sandvägen 4 - 352 45 Växjö Sweden - Tel: +46-470-77 22 00, or on their website: <http://www.fogmaker.com>

Dasa Forester H-series New Generation Harvester Log Making System

Dasa Control Systems AB of Sweden launched a new generation system for optimised log making at ElmiaWood 2013. The sixth-generation system from Dasa has been named Forester, and is aimed at sustainable forest management and optimum yield for forest operators. It draws on the company's previous generation systems and is an

open system available to all manufacturers of harvesters and forwarders.

The Forester product is an integrated system solution that manages the entire information flow from planning of logging operations to computerized log bucking and forwarding operations to the reporting of production and operational data. The system has full support for the new standard for reporting and monitoring, StanForD2010.



Figure 13: Readout of Dasa Forester H-series Log Making System

The Forester product range comprises the following system solutions:

- The Forester H-series bucking system for harvesters
- The Forester F-series production system for forwarders
- The Forester Navi navigation system for harvesters and forwarders
- The Forester Monitor operation monitoring system for forwarders and harvesters
- The Forester Care telematics system for communication and monitoring machinery.

The first product is the Forester H70, a complete system for bucking-to-value in harvesters. The Dasa Forester H70 features a brand new bucking system in the most modern programming environment, making the situation clear and easily manageable for the operator, enabling enhanced bucking, higher productivity and greater timber value.



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More information is available from Dasa Control Systems AB, Hamnerdalsvagen 3, S-352 46, Vaxjo, Phone +46 470 77 09 50, or on the Dasa website (www.dasa.se) or email info@dasa.se.

Elca Radio Remote Controls for Forestry Winches

Elca Radio Controls of Italy have developed the Mito range of professional radio remote control systems. The innovative transmitting panel drives all the functions separately for single and double drum forestry winches. The Mito range comprises the Mini (small handheld set) and the Alpi and Vetta (waist-attached portable transmitters). It includes Listen Before Talk (LBT) technology designed to automatically scan, find and lock onto a clear and available frequency on pressing the start button (enabling continuous operation without any radio disturbances). It has an operating range of 150 m.



Figure 14: Control panel for the Mito Vetta radio remote control system

The Vetta transmitting panel consists of five toggle switches in line plus an emergency stop button. The system includes an internal 3.7 volt Lithium battery giving 50 hours of operation without recharging. Compact and ergonomic size, lightweight (weighing 400g), shock-resistant and waterproof, it is designed with a comfortable belt loop for nylon and leather belts. The complete

Vetta kit includes the transmitter, receiver, battery charger (12/24v DC and 220v AC), waist belt, and receiver wiring with 7/13 pole connector.

More information is available from ELCA S.r.l., Via del Commercio 7/B, 36065 Mussolente (Vicenza) Italy, Phone +39 0424 578500, or from the Elca website (www.elcaradio.com) or email info@elcaradio.com.

Auto-tensioning of Load Securing Chains on Logging Trucks

The Laxo LA is the lightest timber bunk on the market, comprising lightweight aluminium bolsters (9.0 tonne capacity) fitted with a built-in auto-tensioner and a quick-release mechanism on the bunk which enables quick, safe and efficient loading and unloading of both pulpwood and large logs.



Figure 15: Quick-release mechanism on the bolster of the Laxo LA timber bunk

Dimensions of each bolster are: up to 2600 mm (width), loading height up to 3000 mm, and weight 120 kg. The cost is EUR 2000 (\$3,200 NZD) per bolster unit.

The built-in auto-tensioner is extremely lightweight, pre-mounted and well protected inside the bunk.



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The tensioner means the wire is drawn beneath the bunk rather than at the end, enabling the load to be secured from either side. The driver stands at the end of the bunk and can decide from which side of the support they wish to secure the load. The chains or straps can quickly be slackened by pulling the handle on the quick-release mechanism on the bunk.

Due to the handy chain hook there's no need to throw the chain over the load. Instead, it can be hoisted over using the log grapple. This saves time and reduces the risk of strain injury to the driver's back or shoulders.

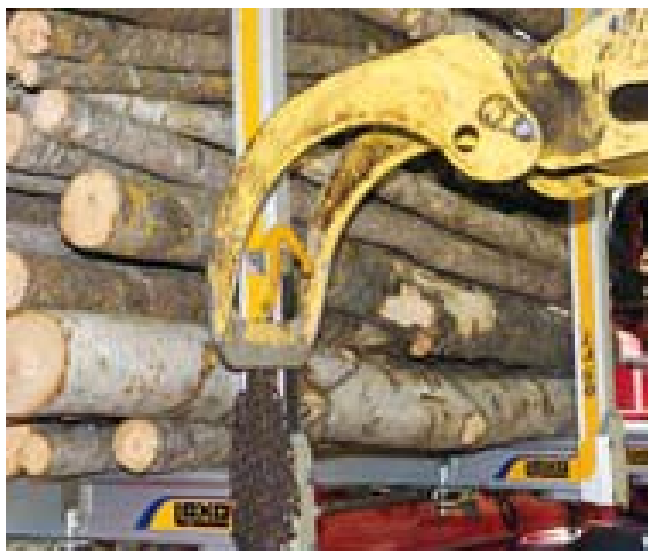


Figure 16: Loader grapple hoisting the chain hook over the load.

More information is available from LaxoMekan AB, Gällerstavägen 101, S-702 21 Örebro, Sweden; Telephone +46 19 30 56 00, or email info@laxo.se or from the Laxo website www.laxo.se.