

Harvester technology for measuring length and diameter of logs is largely the same as that used in the 1980s. Although the system for quality assurance has made measurements more reliable, there is still great potential for improvement.

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3 STEPS TO MORE ACCURATE MEASUREMENT

1 MEASUREMENT

For the past year, Skogforsk has been monitoring a number of quality-assured harvesters in southern Sweden, from which data has been regularly collected with the help of VMF Syd, the Timber Measurement Association of Southern Sweden. Within the harvester group, there is of course a range in the measurement results, but it can be seen that the absolute best maintain a very high level of accurate measurement over time. By learning from the best, the aim is to help the entire harvester fleet.

“The aim is to find out how, for example, machine settings and the operator’s technique affect the harvester measurement. But so far we’ve not been able to find any simple associations,” says Maria Nordström.

“This is probably because there are so many different factors that affect measurement, such as the appearance of the forest, the condition of the measuring equipment, the ability of the operator to follow the stem with the harvester head, machine settings and climate factors. But for individual harvesters, we have been able to identify probable causes of errors in measurement. Right now, we’re working on correcting the identified faults

and monitoring how the measurement is improved.”

Measuring a log can seem to be a simple process, but it is not. The operator must be meticulous and consistent. The calliper measurement is often not carried out correctly, or the diameter may be measured over knot bulges, yet the calliper measurement is the basis for following up the machine’s measurement and for collecting data for calibration. This requires training and greater understanding of the importance of good measurement. The key persons are the auditors in the quality assurance system, who meet and train many harvester operators.



Together with Heurgren Film AB, Skogforsk has produced the instruction film ‘Håll måttet!’ to improve diameter measurement. You can order it from skogforsk.se.

2 OPERATOR SUPPORT

Here, the harvester computer will soon show the current state of the measurement, and give a warning in the event of any anomaly. The software will be able to differentiate between mechanical faults and a need for calibration, and make it easier to see the associations between machine settings and measurement results.

“We hope to be able to identify which key figures serve as indicators of how the system is measuring. There’s a lot of very interesting data that the machine’s control system already logs, and this can be used in combination with manual control measurements. Closer collaboration with manufacturers of machines and measurement systems is now important in order to implement the results in practical application. Whenever we’ve met and discussed these issues, there’s been a lot of interest,” Maria Nordström is pleased to report.

3 ATTITUDE

“At the end of the day, good measurement is a matter of attitudes in companies and individuals. And more knowledge and understanding increases interest. Not until then will there be real chances to succeed,” says Maria Nordström.



Skogforsk’s Maria Nordström is working on developing harvester measurement and quality assurance.

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COACHING & CONTROL

During the visit, Jonas Hemmingsson audits the measurement in Magnus Forsberg's harvester. Jonas measures the sample logs that Magnus has put to one side. Magnus also measures the same logs. This is done to ensure that he is measuring the logs accurately. The calliper can easily be out by a millimetre or so, and so Jonas checks against a template.

“A calliper shouldn't be sold without a template,” he says.

Calliper measurement must improve

It is also about measuring in the right way. Using a calliper to measure diameter is an art, and it is important not to measure across knot bulges. Machine operators sometimes measure systematically incorrectly, so that the harvester receives a signal to reset the measurement equipment, even though it is measuring perfectly. A couple of years ago, Skogforsk carried out a survey of common problems in calibration of the harvester's measurement system. This identified errors in calliper measurement as a major and common problem in forestry.

No problems

Magnus's measurements are excellent, and Jonas can record an approved field test. When the measurements are compared with those of the harvester, 90 percent of the logs are shown to lie within the length specification of +/- 2 cm, and 70 percent within the diameter specification of +/- 4 mm. Approved with merit.

“Your measurements of length are really good,” compliments Jonas Hemmingsson.

During the audit visit, he also has a dialogue with the contractor. And if anything is wrong in the measurement equipment, it can be corrected directly in the machine.

Feedback every other week

Twice a month, Jonas also sends feedback to Magnus about the data sent from his harvester to SDC. The continual follow-up is the basis for detecting deviations and for adjusting the system if necessary. In a joint review of the past months' data, both Jonas and Magnus observe that there was a slight dip in the number of approved logs in February, even though the level was still acceptable. Rapid temperature changes during the late winter were probably the cause.



DEVELOPMENT WITH GREAT POTENTIAL FOR PROFIT

The project, Quality-assured Harvester Measurement, started in 2002. Skogforsk has been the hub, and has collaborated with the forestry sector, machine manufacturers, SDC (forestry IT companies) and VMF (Timber Measurement Association) to develop the system. An evaluation now shows that the initiative has great potential for generating profit.

Text & photo MATS HANNERZ

In brief, harvesters that undergo control measurement reduce the proportion of logs with delivery errors from eight percent to 4-5.5 percent. The proportion of logs that must be shortened (cut because they are not the correct length) is also reduced.

The potential profit after pre-sawing was then estimated at SEK 120 million for the 31 mil-

lion cubic metres of timber reported in 2011. If we examine how much Skogforsk benefits the forestry sector, it can be observed that the annual profit is of the same order as Skogforsk's annual budget.

Calculated over a five-year period, 2010-2014, with gradual introduction of quality assurance of the

harvesters (see table), the current value of the potential profit after deduction for R&D and running costs is estimated to be SEK 657 million.

The running costs (SEK 0.71/m³sub) comprise internal checks, audit costs, training and system management. The overall R&D investment for the project (research and implementation) was estimated to be SEK 11 million (calculated on current value), of which Skogforsk's share was approximately SEK 1 million.

The investment calculation indicates an internal rate of return

of 98 percent and a payback period of four weeks!

Most harvesters report internal checks to SDC, but so far only 25 percent of the timber volume is produced by quality-assured harvesters. Much of the potential, perhaps SEK 0.5 billion over a five-year period, is still waiting to be realised.

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READ MORE: Skogforss Redogörelse no. 1/2012.

In the next edition of VISION, we will be describing other profitable research initiatives.



Implementation of quality-assured harvester measurement			
Year	No. of quality-assured harvesters	No. of reporting harvesters	Total
2010	60	940	1 000
2011	120	880	1 000
2012	240	860	1 000
2013	480	720	1 200
2014	700	500	1 200

Profit by harvester category, 2011			
Harvester category	Volume million m ³ sub	Profit SEK/m ³ sub	Total profit SEK million
Certified/quality-assured harvesters	5	5.5	29.6
Reporting harvesters	26	3.4	90.4
Total	31		119.9

The forecast on which the calculation was based. However, to date, only 220 harvesters have been quality assured – not 700 – so implementation is slower than expected.

MORE ATTRACTIVE BUSINESS PARTNER

ATA Timber's main product is wood for construction. It is a bulk market where, under the prevailing construction standards, a couple of lengths are most in demand in the 22-26 cm saw class. And the dimensions must be accurate.

"It's vitally important for customers that measurements are correct, so our quality assurance

makes us a more attractive business partner," says Roger Tagesson, CEO and Sales Manager of ATA Timber. "Our deliveries are more precise and it also often leads to the customers buying other products from us."

Can the improved delivery quality affect the price?

"No, not really. We have to stick

to two prices: purchase price and selling price. If we were one of few players on the market, we would be able to set special prices for such good quality, but in a market where so many players compete by lowering prices and offering large volumes, the quality aspect is more about continuing to be an attractive supplier."



"Gives satisfied customers and sales of other products." Roger Tagesson at ATA is dependent on quality-assured harvesters.