

ShortCuts

FROM SKOGFORSK. NO 4 | 2015 | RESEARCH FOR TOMORROW'S FORESTRY

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FEWER BUCKING SPLITS WITH V-SHAPED SAW BAR

Great value is lost every year due to bucking splits in sawn wood products, but a V-shaped saw bar can reduce the occurrence of bucking splits by over 80 percent.

■ “The shape of the bar affects the sawing pattern and, in bucking, a V-shaped cut is made. Our research shows that this saw pattern can counteract the moment of force generated by the hanging end of the log, thereby helping to prevent bucking splits,” explains Björn Hannrup, researcher at Skogforsk.

The new saw bar has been tested on pine and spruce logs, and the results compared with logs cut using a traditional bar.

“The proportion of logs with splits was 3-6 times lower with the new V-shaped saw bar, and the splits that did occur had less impact on the main yields. Not

only were there fewer splits, but those that did occur were concentrated to the outer edges of the logs,” says Björn Hannrup.

The bars were also tested in the new Skogforsk test rig. The results showed that cutting time and energy consumption when using the V-shaped saw bar were the same as when a traditional bar was used.

The new saw bar was developed by V-Cut, manufactured by Iggesund Forest, and evaluated by Skogforsk, with Sveaskog hosting land and machinery. The work is part of the forestry sector’s technology focus on productivity and damage minimisa-



PHOTO: SKOGFORSK

The new V-shaped saw bar and a conventional saw bar.

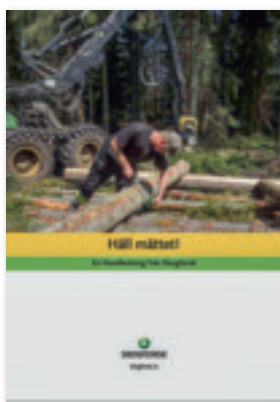
tion. Development in collaboration between users, manufacturers and researchers is an important feature of this work.

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NEW GUIDE FOR BETTER HARVESTER MEASUREMENT

Skogforsk’s new guide describes harvester measurement and how operators can continually monitor the work, and adjust the system as and when necessary.

■ Successful wood processing requires smooth-running technology, correct settings and an efficient working method. The harvester operator plays a key role in accurate measurement, since both quality control and calibration are based on manually measured control stems.



READ MORE:

The guide ‘Håll måttet!’ can be downloaded from skogforsk.se. Also available is a Skogforsk instruction film with the same name.



PHOTO: SVERKER JOHANSSON/BITZER

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NEW DECISION-SUPPORT TOOL WILL FIND HIDDEN RELICS

The forestry sector is making concerted efforts to reduce damage to relics and cultural heritage sites. Skogforsk is developing a decision-support tool that uses laser data to find relics and sites.

■ Many relics and cultural heritage sites are damaged during logging and other silvicultural activities. One problem is that digital maps of known relics and sites are of poor quality, and that less than half of the relics and cultural heritage sites and objects in the forest are known. Many relics do not appear on maps, but the Heritage Conservation Act and the Swedish Forestry Act apply to them nevertheless.

Skogforsk is now developing a decision-support tool that interprets the landscape ahead of logging, and allows identification of relics and cultural heritage sites and objects. Their presence can then be confirmed in the field during operational planning.

"We can see landforms and structures that indicate relics," says Skogforsk's Erik Willén, "but we can also see trapping pits, clearance cairns and charcoal pits that are commonly found in the forest."

The method has been developed in 2015, and in 2016 the first decision-support tool will be evaluated during operative planning in collaboration with forestry companies. The project is financed by Skogssällskapet, the Swedish Forest Society Foundation.



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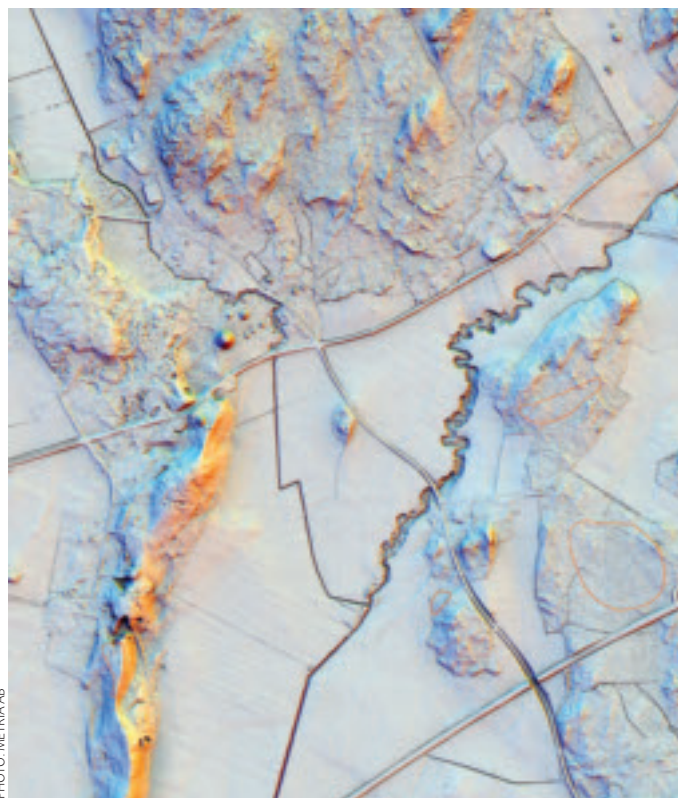


PHOTO: METRIA AB

An example of decision-support data for interpretation before operative planning. The terrain is displayed as if the sun were creating shadows from all directions simultaneously. This highlights features such as pits and cairns, and linear structures like ditches or walls.

Many roads can support 74-tonne vehicles, but not all.



STOP PRESS! 74-TONNES IN SIGHT

Within the current budget, the Swedish Transport Administration believes that a limited road network can be opened up to 74-tonne trucks. However, opening up the entire load class BK 1 road network for 74-tonne vehicles would probably cost SEK 12 billion and take 12-24 years.

■ In the Swedish Transport Administration report, Fördjupade analyser av att tillåta tyngre fordon på det allmänna vägnätet, the introduction of a BK 4 road network for 74-tonne vehicles was analysed.

According to the analysis, most of the road network with high cargo flows would cope with heavier loads relatively well.

However, infrastructure limitations make it impossible to commission the entire BK 1 network immediately – long-term investments will be needed. In early 2016, Skogforsk's analysis of the effect of these restrictions on how forestry benefits from the identified road network will be published.



The report is available at
<https://online4.ineko.se/trafikverket/Product/detail/50162>.

WHAT DOES SILVICULTURE REALLY COST?

Dragging a 30-year-old harrow across all types of ground is no guarantee of cheap and successful regeneration. Just as important are that the plants become established quickly and that pre-commercial thinning costs are kept down. Here, the correct choice of scarification method can be significant – even if it is more expensive. *Text & photo: SVERKER JOHANSSON | sverker@bitzer.se*

Helena Gålnander inspects the deciduous brush growing in the disc trencher tracks.

“The idea is to minimise the total cost of silviculture up to and including final pre-commercial thinning, and not become fixated with individual processes. HELENA GÅLNANDER

■ Silviculture is becoming ever more expensive. Felling costs are steadily decreasing, costs of scarification and planting remain virtually unchanged, but the cost of pre-commercial thinning has increased in recent years.

“There have been very few studies of the entire stand regeneration chain,” says Helena Gålnander, who is leading a new project in which Skogforsk is conducting an in-depth study of how stand regeneration can be improved and total costs reduced.

“The idea is to minimise the total cost of silviculture up to and including final pre-commercial thinning, and not become fixated with individual processes, which is what the forestry sector currently does. We try to minimise the cost of each individual activity, instead of looking at the total cost and quality in the entire chain.”

Difficult problem to tackle

After a first round of interviews, Helena Gålnander concludes that there are a number of obstacles, even if most forest professionals and contractors she has spoken with are very aware of the problem.

“Many see the problem of the extensive deciduous brush growth after simple disc trenching, but say it’s difficult to convince their employer to adopt a more expensive type of scarification when the gain doesn’t come until ten years later. Not until we have more knowledge anyway.”

Link to scarification experiments

Skogforsk is now linking the study of the silvicultural chain with the large scarification experiments started in 2015, where the inverse scarifiers, Kovesen and Kicken, are being compared with mounders and disc trenchers.

“We will be examining future needs for pre-commercial thinning on these plots,” explains Lars-Göran Sundblad, who works with scarification issues. “How the deciduous brush is affected by scarification method on different sites is our biggest gap in knowledge when it comes to improving analysis and proposing better planning procedures for the future.

“It’s especially important to examine these issues when new scarification methods and new plant breeding materials are developed,” emphasises Lars-Göran Sundblad. “For example, good scarification could be allowed to cost more than it does today if this considerably reduces other costs in the chain.”



L-G Sundblad wants to cut overall costs: “Look at the costs along the entire forestry chain. If the scarification costs more, then maybe the pre-commercial thinning will cost less. High-quality and slightly more expensive scarification can be a good investment.”

Smaller, cheaper plants can be used. Experiments show that small plants, cheap to grow and plant, survive well and become established quickly if they are planted in ground where a good scarification technique, such as inverse scarification, has been used.

3 EFFECTS OF BETTER SCARIFICATION

The number of plants can be reduced, because more plants survive.

The cost of pre-commercial thinning can be considerably reduced. Disc trenching affects a very large proportion of the clear-cut area, while other, less intrusive methods affect a much smaller area. And deciduous brush is considerably reduced.

THE ETT PROJECT

GREEN TRANSPORTS THE GOAL

In Sundsvall SCA wants to use 90-tonne timber trucks to reduce both environmental impact and costs, but is still waiting for a licence from the authorities. And timber transports by rail are threatened by poor track maintenance.

"An absolutely absurd situation," says SCA's transport manager, Sofia Johansson.

Text & photo SVERKER JOHANSSON | sverker@bitzer.se

■ When log driving on rivers ended in the 1960s, the forest industry in Sundsvall needed a new timber storage and sorting facility. Töva offered a good strategic position, west of Sundsvall, and along the railway and main road towards the interior.

Since then the Töva system has been the hub of timber transports to the coast. Wood is transported by truck to the mills, and 24,000 wood transports a year have previously taken place on the routes in urban and semi-urban environments. However, traffic has decreased considerably in the past couple of years, since SCA contracted three 74-tonne timber trucks.

Boost for railways

The company has been granted a special licence for these trucks, which are only permitted on the Töva route. More axles reduce axle pressure, but the gross weight can affect bridges and roads with low bearing capacity. However, the heavier trucks can really benefit the entire transport system.

"Lower transport costs from Töva mean that we can increase timber volumes transported by rail from other terminals," says Sofia Johansson, who is responsible for the Töva transports. "We believe that the entire truck-train-truck transport system becomes more competitive when larger, more efficient, trucks are used. The potential catchment

areas of railway terminals in the interior are also enlarged."

Poor track maintenance a threat

But while SCA is trying to find efficient combinations for train and truck transports, a new threat to rail transport has appeared.

"Track maintenance is terrible," says Sofia Johansson, "which is a great worry. Timber flows on the railways cannot be replaced with trucks – that would be both more expensive and much worse for the environment. It seems really absurd in a situation where we are trying to reduce the environmental impact of transports."

However, for the time being, timber is still brought by rail into Töva, where large trucks take over the transport. The density of the wood transported is relatively low after a long period of storage. When the 74-tonne vehicles are full, they still have spare payload capacity, and load utilisation is no higher than 85 percent.

"So we're kicking our heels, waiting for the Swedish Transport Agency to approve 90-tonne, 30-metre trucks on this route," says Sofia Johansson. "These trucks are designed to be upgraded – when we can increase the length there'll be room for an extra stack of timber. And that's important, because the payload can then increase from 45 to 60 tonnes. Load utilisation will also increase, up to

95 percent, which is a very good figure."

"With 90-tonne trucks, we also reduce the number of trips in this urban and semi-urban environment, from 24,000 to 15,000. Already with 74-tonne trucks, fuel consumption has fallen by 15 percent, and 90 tonnes would reduce fuel consumption by at least another 12 percentage points. So this is very important for the environment."



“ The entire truck-train-truck transport system becomes more competitive when larger, more efficient, trucks are used.



4 PRIORITISED FOREST ISSUES IN THE ETT PROJECT

Skogforsk is currently compiling knowledge and experiences from the ETT project, but hopes to conduct, for example, the following four studies:

1 | Analysis of what proportion of forestry transports are affected by the Swedish Transport Administration's proposal for roads where 74-tonne trucks are permitted.

2 | ETT 90 shows that longer vehicles improve load utilisation, but there is a lack of knowledge about longer vehicles dedicated solely to forestry transports.

3 | More in-depth analyses of how different assortments and bucking affect load utilisation.

4 | Studies of more weight combinations, truck configurations and transport systems to maximise environmental benefit and cost efficiency throughout the logistics chain.

ENVIRONMENTAL AND COST BENEFITS:

ETT TRUCKS DELIVER

In the past year, transports of 38 million tonne-km were carried out in the roundwood part of the ETT project. The higher payload reduced total fuel consumption by 106,000 litres and CO2 emissions by 307,000 kg.

Victor Asmoarp, manager of the project at Skogforsk, is satisfied.

“If this could be scaled up to all forest transports, in a single year this would save no less than 16.8 million litres of fuel, and 44.2 million tonnes of carbon dioxide,” he says. “So we’re talking about very big potential improvements.”

On average, the weight-based load utilisation in the study has been as much as 92 percent, but vehicles with a gross weight of 74 tonnes are sensitive to wood of low density, which reduces load utilisation.

Even individual 74-tonne group vehicles (without crane) transporting forest-stored wood have had problems with load utilisation, and for all vehicles it is difficult to keep the payload figures up during the summer months.

“Highest load utilisation is in the ETT 90- and 68-tonne group

trucks, so there is potential to get closer to the optimum using longer vehicles and more stacks. It also means that vehicles can be adapted to the prevailing conditions,” says Victor Asmoarp.

Experiences from Finland, which has come further than Sweden in terms of introducing heavy trucks, have also shown the difficulties of attaining full load utilisation when gross weight increases.

“Our follow-ups confirm this, and it’s most evident on the Töva vehicles,” says Victor Asmoarp. “So it also seems important when transporting stored wood to adjust the type of route to 90 tonnes in order to optimise climatic and cost benefits.”



“If this could be scaled up to all forest transports, in a single year this would save 16.8 million litres of fuel, and 44.2 million tonnes of carbon dioxide.

Fuel and CO₂ reductions generated by heavier vehicles compared to vehicles with a gross weight of 60 tonnes.

Vehicle	Transport (tonnekm)	Fuel consumption (l) HCT	Fuel consumption (l) 60 tonnes	Reduction (l)	Reduction CO ₂ (kg)
ETT90	8090964	135848	159821	23973	69282
STGrupp68	2354313	51148	58790	7643	22088
STGrupp74	10577120	234304	269315	35011	101182
STKran74	14649008	380049	409977	29928	86493
STTerminal74	2308769	65380	75150	9769	28234
TOTALT	37980174	866728	973053	106325	307278



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