PRACTICE ABSTRACT 4

Risupeto – a novel felling head for efficient harvesting of small diameter wood biomass both in forests and edge zones of infrastructure

Thinning of young stands improves the value of the growing stock and its durability against pests and diseases. The main problem with the utilisation of untended stands is that small-diameter trees are expensive to harvest for energy use and, on the other hand, not all forest owners can afford to tend their sprawling stands into production condition. Tree volume governs the productivity in small tree harvesting and for each situation must identify the minimum tree volume that makes harvesting economic: Below such a size, productivity does not reach the required level, and the value of the harvest fails to exceed the machine's operating cost.

Until now, the equation has appeared difficult to solve, but a wood harvesting innovation – Risupeto harvesting head - that works on a continuous basis can provide a solution to the problem of untended young stands, as at least part of the costs can be covered by revenue from energy wood sales. It is estimated that the device is most effective in the selective tending of dense 5–8-metre seedling stands and young forests. Maximum productivity is achieved when stems to be removed can be harvested at their full length without having to cut them into shorter pieces. With a robust harvester head capable for continuous cutting and accumulating during crane movement, it is possible to improve the felling-bunching productivity compared to multi-tree handling with conventional accumulating felling heads, equipped with saw bar or shear blade cutting elements.

Risupeto (www.reformet.fi/risupeto/) prototype felling head cuts standing trees with two parallel disk sawblades and accumulates trees in an upright position to the collecting chamber using rotating collecting arms. The collecting arms are attached to the two vertical cylinders, which rotate at the same speed as the disk sawblades. When the collecting chamber of the felling head is full, the accumulated tree bunch is moved to the pile and dropped out. The unloading of the tree bunch is done by tilting the felling head downward and rotating the disk saws and collecting arms in the opposite direction from that during cutting.

The width of the hydraulically powered accumulating felling head is 1.0 m, and the maximum cutting diameter with one cut is 1-30 cm. The accumulating felling head is attached to the boom tip of the medium-sized crawler excavator. The advantages of excavators produced in high volumes include a purchase price lower than that of conventional forest machines such as harvesters and forwarders and, outside the harvesting season, the option of removing the harvesting equipment and using the base machine in the work for which it was originally designed.

Photo: Reformet Oy

KEY WORDS

Energy wood, continuous felling-bunching, logging, excavator, cutting device

COUNTRY

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ADDITIONAL INFORMATION

Risupeto is also capable for forest fuel production from overgrowth brushwood when regular clearing of forest roadsides, the edges of arable land, power line corridors and other infrastructural objects has been neglected for some reason. Such brushwood consists of saplings, bushes and young trees of a range of deciduous plant species mixed with conifers. Overgrowth brushwood, e.g. in the edge zone of arable land, shadows the field, reduces the harvest, and can even prevent the functioning of the ditching system if the woody vegetation growing is not cleared regularly.

The basic economic advantages of brushwood recovery are that the cost of harvesting can be offset by the existing clearing costs and income from the harvested biomass. Normal maintenance includes regular clearing of brushwood along roadsides and field edges, e.g. with rotor or chain mulchers, and thereby only involving cost but no revenue. Clearing cycles and management distances are derived from existing clearing technology, growing conditions, and species; faster growth on fertile soil requires more attention. In the worst case, overgrowth brushwood cannot be cleared by normal maintenance machinery and instead must use harvesting technologies developed for small tree harvesting. In contrast to brushwood clearing, the productivity of mechanized small tree harvesting improves with increasing tree size and harvest intensity.

Disk sawblades made of wear-resistant steel seems to be an appropriate choice for work in tough conditions e.g. on forest roads or at field edges with lots of stones or other objects in the soil and vegetation. In addition, the semi-sharp disk sawblades shatter the cutting surface of the stump, which may prevent brushwood coppicing and regrowth.

Photos: Reformet Oy

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ABOUT BRANCHES

BRANCHES is a H2020 "Coordinaton Support Action" project, that brings together 12 partners from 5 different countries. The overall objective of **BRANCHES** is to foster knowledge transfer and innovation in rural areas (agriculture and forestry), enhancing the viability and competitiveness of biomass supply chains and promoting innovative technologies, rural bioeconomy solutions and sustainable agricultural and forest management.

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THE PARTNERSHIP

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