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Evaluation of a prototype harvester head for rough delimiting and compression in early energy wood thinning

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The objectives of this study were to evaluate and compare the productivity and operating costs of two fuel wood harvesting systems in dense early thinnings, from stand to road-side: 1) a harvester with a Bracke MAMA head prototype featuring a feed-roller system for compression-processing and a standard forwarder; 2) a harvester with the Bracke C16 accumulating felling head and a forwarder with a grapple-saw for bucking. The aim was to identify the developments that will be required to improve the effectiveness of the system based on the prototype MAMA head. The time required for the felling, accumulation, compression-processing and bunching of tree-parts at the strip-road side was no greater than that required for the corresponding felling and bunching of whole trees with the C16 head. The feed-roller system increased the efficiency of the bucking process and also increased the harvested biomass bulk density when bunched at the strip-road side by 47-70%. Compression-processing reduced the harvesting yield by 10-23%. Consequently, the harvester productivity with the MAMA head was 12-14% lower than with the C16 head. The MAMA head increased the size of the forwarder pay-loads by 17-24%, and increased productivity by up to 12% for a forwarding distance of 300 m. Even though the MAMA head is an early prototype that has not been optimized in terms of mass and functionality, its operating costs are already comparable to those of conventional alternatives. If the head is further optimized, it can be expected to reduce the harvesting costs from stand to road-side significantly.