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## Technical Note #2

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### The L.D.C. Processing Head, Model 421

The L.D.C. 421 Processing Head is a harvesting attachment that can be mounted on a wide range of knuckle-boom carriers. The price of the unit is competitive with existing heads. Although the machine normally produces tree-length wood, it is expected that an attachment for the production of short wood will be made available by the manufacturer.

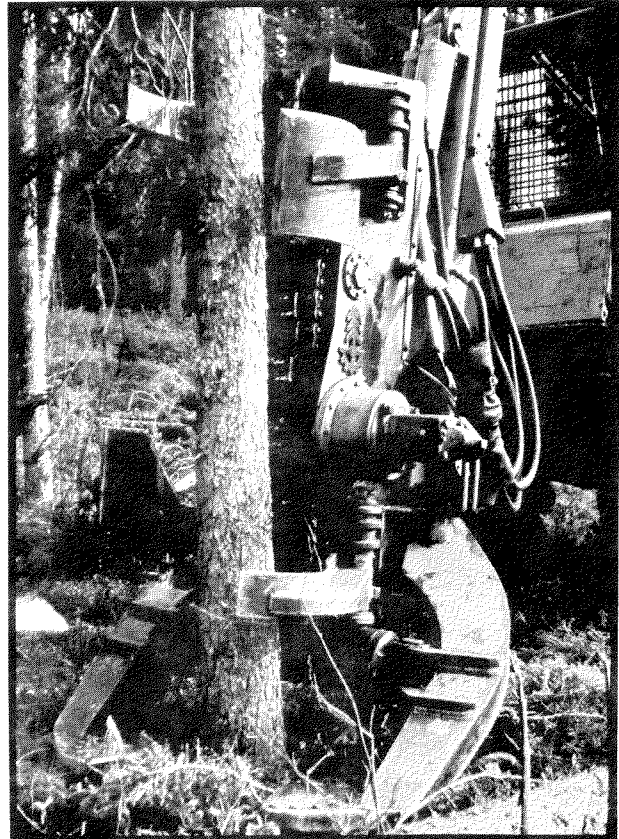
Interest in the L.D.C. 421 has resulted mainly from a number of design features. One such feature is the open, angled configuration of the shear frame, which increases operator visibility and allows a "scooping" action in deep snow conditions. Another feature is that the shear blades are set low on the shear frame. This allows shearing at ground level, but may increase shear maintenance. A third feature is the weight of the machine. At 3,450 lb (1,565 kg) it is the lightest of the three heads that are currently available.

The evaluation of the productive potential of the L.D.C. 421 when producing tree-lengths was carried out in a fully-stocked stand of black spruce (*Picea mariana* (Mill.) B.S.P.) on the timber limits of Rexfor, Chute-aux-Outardes, Quebec. The results compared favourably with data collected on other harvester heads.

The average harvesting time per tree was 81 cmin (0.81 min), resulting in an average production of 74 trees per productive machine hour (PMH). The average volume per tree was 4.6 ft<sup>3</sup> (0.13 m<sup>3</sup>). Average productivity as calculated from average time and average volume per tree, equalled 3.4 cunits (9.6 m<sup>3</sup>) per PMH.

Total harvesting time was influenced most by the volume per tree and by operator differences. When the volume per tree was increased by 2 ft<sup>3</sup> (.06 m<sup>3</sup>), the resulting increase in harvesting time was 7 cmin. Volume per tree had a varying effect on productivity; an increase from 4 to 6 ft<sup>3</sup> (.11 to .17 m<sup>3</sup>) increased productivity from 3.0 cunits to 4.1 cunits (8.5 to 11.6 m<sup>3</sup>) per PMH. The difference between the two operators, both of whom had 10 months experience on the machine, was 13 cmin per tree.

Shear damage caused to the butt ends of freshly cut trees was also examined. Since the measured dam-



The L.D.C. 421 Processing Head.  
Note the angled configuration of the shear frame.

age averaged only 7 inches (18 cm) it can be assumed that this machine could be used for the harvesting of sawlog material.

Few problems were observed during the limbing process. The chain-drive feed mechanism was adequately powered and the limbing quality was good. Some problems did occur when the machine encountered crooked trees, forked trees, and trees with clusters of large branches.

The machine's major operating limitation arises from the lack of a topping shear. There is no opportunity to position the tree after it is topped. This produces windrows of tree-length wood which do not lend themselves to subsequent skidding by grapple skidders.

Details of this study appear in FERIC Technical Report No. 2, entitled "Evaluation of the Logging Development Corporation Processing Head, Model 421", by M. P. Folkema and R. Legault. If you would like a copy of this report, please complete and return the enclosed reply card.