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NEW ZEALAND

THE WEYERHAEUSER FELLER-DIRECTOR

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INTRODUCTION

In the last decade, a great number of saw felling heads have appeared in response to the need to minimise the butt shatter common to shearing. Unfortunately, none of these commercial heads met all of Weyerhaeuser's particular needs :

- (1) Chainsaw cut quality required for the ends of export logs
- (2) Cut capacity up to 86 cm in second growth Hemlock and Douglas fir, and
- (3) Ability to operate on slopes up to 60% (two-thirds of our forest land).

Several self-levelling feller-bunchers were commercially available which could operate on steep slopes but they had to be capable of handling large second growth timber. The weight of typical feller-buncher heads compromised the carrier's lifting capacity, and the size of carrier required to fully control such trees increased capital costs considerably.

In our assessment of saw felling and bunching systems, we visited Koehring and Rotosaw operations in British Columbia, did a preliminary design and potential production analysis of a larger disc saw head, and visited the Hultdins feller-director operating in Sweden and Canada.

The system selected for testing was the Hultdins F60 feller-director head on the self-levelling Timbco 2518 carrier (Figure 1).



Figure 1 - Timbco 2518 with Weyerhaeuser W-34 Feller-Director head

There were several reasons why this system had the potential to satisfy our needs :

- (1) the head could easily be modified to increase its cut diameter
- (2) the head's weight maximised net lift of the boom, allowing the use of a moderately sized (priced) carrier

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- (3) the carrier had a boom tip load capacity of 2700 kg at maximum extension of 7.0 m and, with self-levelling to 51%, was capable of safely working on slopes up to 60% (31°), and
- (4) the feller-director type of head provided maximum flexibility for bunching trees at all angles to the carrier with minimal moving in the stand (see Figure 2).

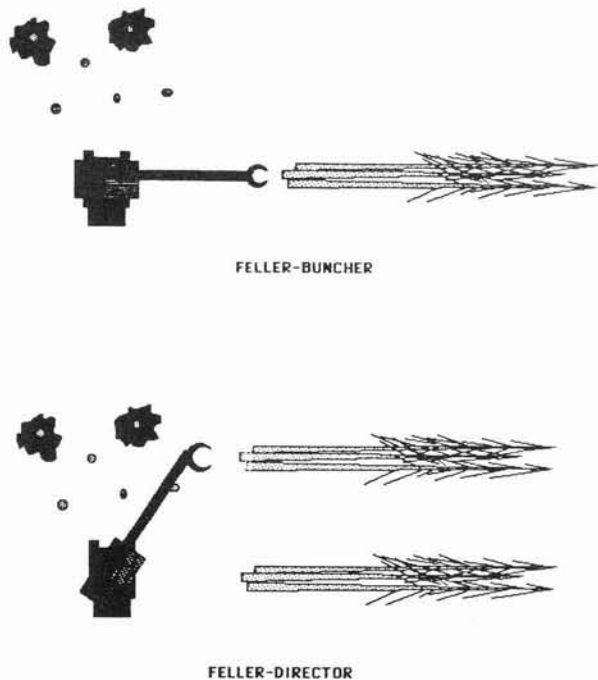


Figure 2 - Feller-Buncher versus Feller-Director

HULTDINS FIELD TRIALS

Field trials of the Hultdins/TimbcO feller-director were conducted during 1984 in Weyerhaeuser operations around Chehalis, Washington. During this time, the F60 was extensively modified to better meet our operating conditions. For example :

- the saw pivot was moved to fell a 61 cm tree at only 10 degrees from the grapple centre line, improving directional control of big trees (Figure 3).
- the grapple tips were extended 10 cm to limit the size of tree handled and to better retain a tree in the grapples.

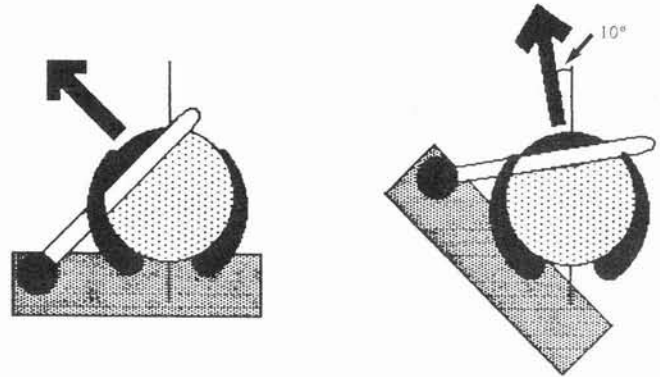


Figure 3 - Hinge wood dependence on saw pivot location

- a horizontal plate was added to the boom tip for pushing trees too large to lift.
- the saw scabbard was reinforced to minimise distortion from impacts, and the frame around the grapple pins was strengthened.
- a hydraulic tilt-up cylinder was installed to assist in placing the head on to a tree

After analysing data from time studies of the modified Hultdins head, it was concluded that the feller-director system had the potential to meet our objectives, but that the Hultdins F60, even as modified, was not strong enough and had the wrong grapple geometry to properly grip the trees it felled.

WEYERHAEUSER W-34

In August 1984 a complete redesign was ordered with the objective of incorporating all the improvements of the modified Hultdins head, plus a number of other important changes to the grapple, rack, frame and hydraulics. The result was the Weyerhaeuser W-34 feller-director head, shown in Figure 4.

The new 860 kg, feller-director head was installed in November 1984 using the saw assembly from the Hultdins head. In September 1985 a new saw assembly was installed which retained the standard .404 chain and 91 cm bar and incorporated the following improvements :