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FULL CHISEL TRI-RAKER TESTED

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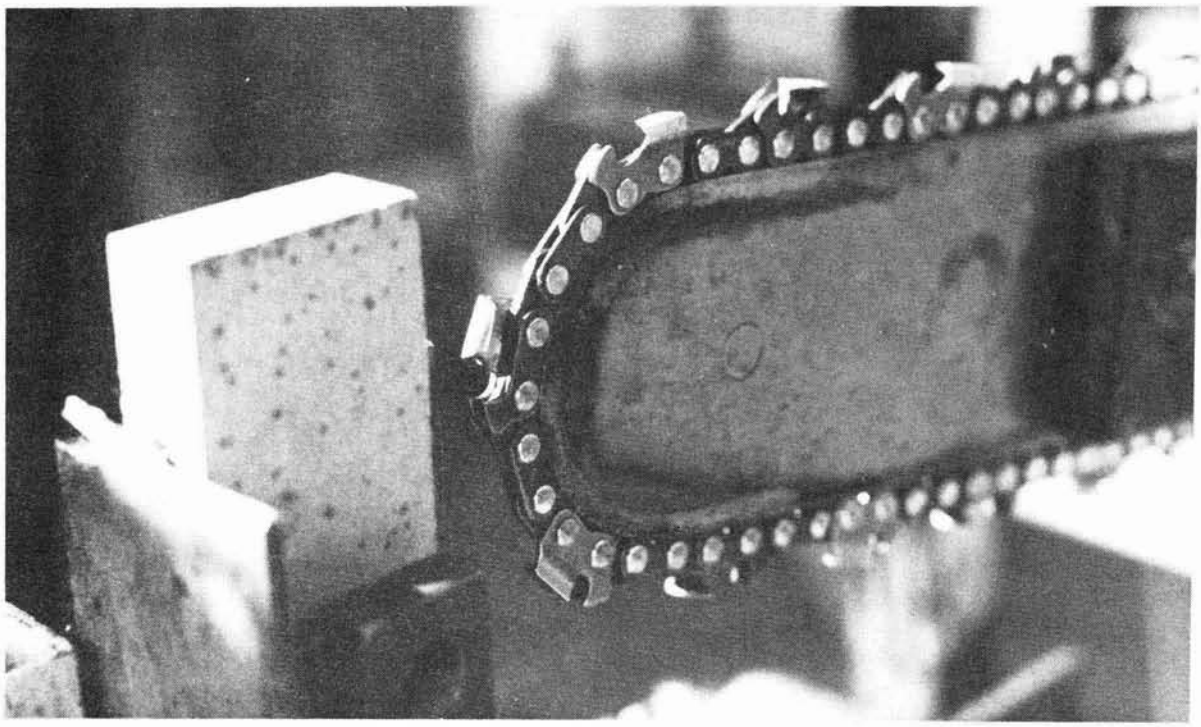


Figure 1 - Tri-raker 988 on kickback test rig

INTRODUCTION

In 1983, Sabre's Tri-raker 888 chainsaw chain was tested for kickback energy and cutting performance (Ref. 1). The results showed that Tri-raker did have significantly less kickback energy, but cutting performance was lower compared with other brands of chisel chain. As Tri-raker 888 was a semi-chisel chain, it was considered that full chisel Tri-raker should be tested to verify the conclusions.

Recently, LIRA received a sample of full chisel Tri-raker 988 chain for evaluation. This Report summarises the tests that were carried out.

ACKNOWLEDGEMENTS

LIRA acknowledges the assistance of Rebas Marketing Company who supplied the chain, and the use of the New Zealand Forest Service Engineering Division workshop at Tapawera, where the controlled tests were carried out.

THE CHAINS TESTED

Tri-raker 988 is similar in configuration to the 888 chain, having an additional depth gauge on the tie-strap adjacent to the cutter, and a further depth gauge incorporated in the drive link immediately in front of the cutter. The only apparent difference is the shape of the edge formed between the top plate and the side plate of the cutter (988 being square, 888 being rounded). It is this difference which makes 988 full chisel chain.

Ref 1 Prebble, R.L. "LIRA Tests Tri-raker Anti-Kickback Chain", LIRA Report, Vol. 8 No. 11, 1983

In order to make a direct comparison of kickback energy and performance capabilities, Tri-raker 988 was tested alongside Oregon 73LP, which was one of the full chisel chains evaluated in the earlier tests. Both chains were 3/8" pitch and .058" gauge.

THE TESTS

Workshop Testing

As with the 1983 evaluations, the workshop testing was carried out at the New Zealand Forest Service Experimental Workshop at Tapawera. The same rigs were used for both kickback energy and cutting performance tests, but the kickback rig had been modified to change of method of supporting the customwood test block. The change meant that the end, rather than the face, of the block was struck by the chain. Unfortunately, this change created a difference in the magnitude of kickback energy produced, and therefore the latest results cannot be compared directly with the earlier tests. All other components were the same and the counter weight attached to the arm holding the test block could still be adjusted to change the amount of force with which the block struck the chain. Twelve tests were carried out with the weight set at 2.0 kg, and twelve carried out with it at 3.1 kg. The resulting kickback energy was measured in Newton-metres (Nm).

The cutting speed tests were done with 4, 5 and 6 kilogram weights acting on the saw. The billet of wood used was 257 mm x 151 mm.

Field Tests

Using a 62 cc chainsaw with a 38 cm bar, Tri-raker chain was timed through a series of downcuts, undercuts, and bore cuts to assess operational performance. The log used for the tests was 14 year old radiata pine which had been fallen for a demonstration six months previously, and had dried out considerably. The average diameter of the log was 29.5 cm, but after each cut, the diameter was measured to enable exact calculation of the cross-sectional area. Where knots or nodal sewllings were encountered, the results were disregarded and a new cut performed.

To complete the field tests, two loops of Tri-raker 988 chain were used in felling and delimbing work for one week, and the subjective comments of both users recorded. Both chains were on 62 cc saws with 38 cm bars.

RESULTS

Kickback Tests

During the kickback tests, Tri-raker 988 produced significantly less kickback energy than the Oregon chain under the same circumstances (refer Figure 2). With the 2.0 kg weight acting on the test block, Tri-raker returned an average of 1.51 Nm kickback energy compared with the 5.39 Nm generated by the Oregon chain. This result suggests that Tri-raker 988 produced 72% less kickback energy than the Oregon chain. A similar result occurred with the 3.1 kg weight attached to the test block where Tri-raker produced 3.46 Nm kickback energy, and Oregon had 12.83 Nm. There was also a wider variation in the test results recorded with the Oregon chain compared with the Tri-raker, as shown in Figure 2.

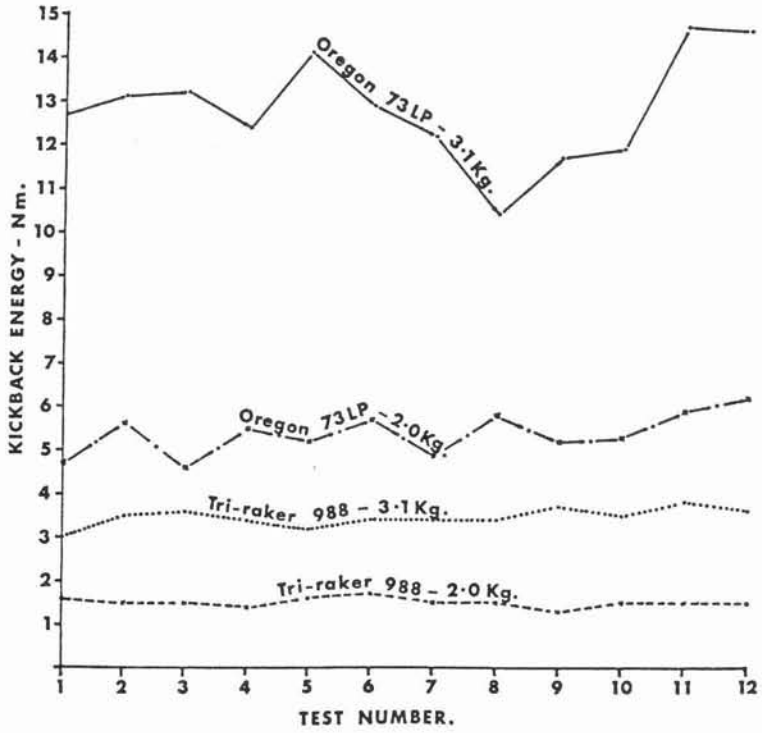
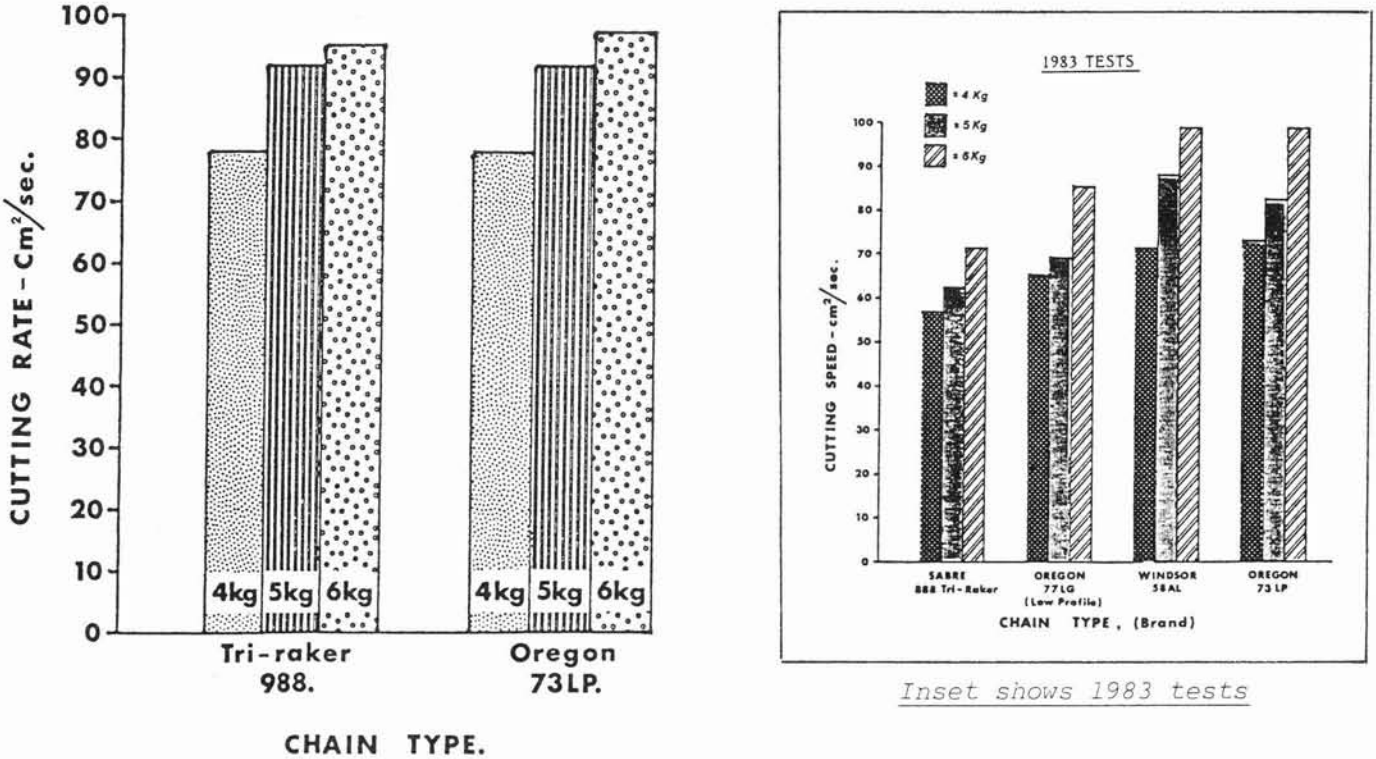


Figure 2 - Chainsaw chain kickback tests

Cutting Rate Tests

The results from the cutting rate tests are expressed in Figure 3. There appeared to be virtually no difference in performance between the two chains. Over the three lots of testing carried out, the Oregon 73LP was 1.4 cm^2/sec. faster and this was mainly due to the higher cutting speed recorded with the 6 kg weight acting on the saw. The result also compares favourably with the 1983 cutting rate tests.



Inset shows 1983 tests

Figure 3 - Cutting rate tests

Field Tests

Cutting rates during the timed field tests were slower than expected, but this was attributed to the dryness of the log being cut. The results are shown in Table 1.

Table 1 - Analysis of Operational Cutting Techniques

Technique	*Number of Observations*	*Mean Performance*	*Range cm^2/sec*
Downcut	*10*	*82 cm^2/sec*	*71.2 - 94.9*
Undercut	*10*	*87 cm^2/sec*	*64.8 - 91.7*
Bore cut	*10*	*74 cm^2/sec*	*65.3 - 80.4*

It can be seen from Table 1 that Tri-raker 988's bore cutting performance was 90% of its downcutting rate, and it was capable of undercutting at 106% of the downcutting rate.

During the felling and delimbing work, which was carried out in 14 year old radiata pine in Kaingaroa Forest, both samples of the Tri-raker 988 chain performed well over the four day period. Neither operator experienced any major kickback instances during the trial and there were no problems with sharpening the chain or taking the drags down.

The retail cost of Sabre 988 chainsaw chain is the same as for standard chain.

CONCLUSION

Sabre Tri-raker 988 chainsaw chain significantly reduces kickback energy with only minimal loss of cutting rate. Its undercutting and bore cutting performance was comparable with the results from other chains tested in 1983. No problems were experienced in filing the chain, and it maintained its cutting edge for a reasonable working period. No estimation of the expected life of the chain could be given because of the brief duration of the evaluation.

A recent analysis of the logging industry Accident Reporting Scheme has shown that over 32% of all chainsaw injuries are caused by kickback. All the indications from this evaluation suggest that Tri-raker could effectively reduce both the incidence and severity of these accidents.

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