



Interpine Forestry Ltd

Value Retention During the Harvesting Process

October 2001

Ref. No: FIEA01102001

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Print Date: March 1, 2002



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1 INTRODUCTION

A study completed in 1986 (Murphy and Twaddle) concluded that 40% of the value of a forest could be lost in the harvesting process.

Interpine Forestry Ltd has been working with several companies during 2001 installing processes to reduce the value loss at harvest. This paper is a summary of two of those studies.

“You cannot manage what you cannot measure”

To determine value loss you need to establish points at which to measure value during the harvesting process.

These points are :

1. Inventory – standing trees sampled using MARVL
2. At logmaking - entire stems on landing.
3. At weighbridge – processed logs delivered to a customer.
4. The market opportunity



2 FINDINGS

2.1 RESOURCE INVENTORY

During the studies we used Forest Research MARVL inventory package.

Initially we audited existing plots for accuracy. Plots were scored according to the importance of measurements to the overall result. (Uncounted trees were a major demerit, as were unrecorded knots in the pruned. Mis-called sweep was a minor demerit.)

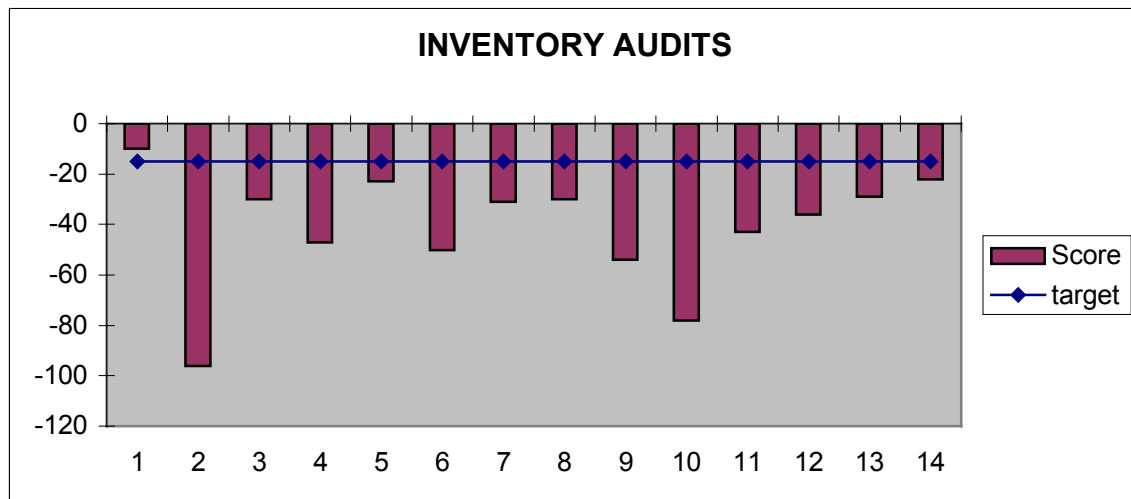


Figure 1 Inventory Audit Results : " Fewer than 15 demerits is a pass. 1 plot in 14 was acceptable."

As can be seen from the graph. Only one plot in 14 was acceptable. As a general rule technicians are over calling quality, (missing knots in pruned, under calling knot sizes and sweep) and under estimating volume, (missing trees in plots). A typical error is to call one quality above about 12 metres.

The general conclusion is that technicians are rushing to complete plots and missing features. As a result value per m³ is being over estimated and volume per ha under estimated.



For our two case study companies the results were :

<i>Co. A</i>	<i>Volume under estimated by 3%</i> <i>Value per m3 overestimated by 4%</i>
<i>Co. B</i>	<i>Volume underestimated by 4%</i> <i>Value per m3 underestimated by 11.3% (this is unusual)</i>

2.2 LOG-MAKING

Once stems were hauled to the landing TimberTech calipers were used to determine value. The Interpine Technicians measured a statistically representative sample of stems. Probable Limits of Error for stem diameter, length and piece size were under 5%.

In the case of company B, log makers were using TimberTech in their daily operation. Co A were manual log making.

Results were

<i>Co.A</i>	<i>Lost 6.5% of potential value at log making</i>
<i>Co.B</i>	<i>Lost 2.8% of potential value at log making</i>

During value recovery audits over several years Interpine Technicians have recorded value losses ranging from more than 50% to less than 2%.

Value recovery results for both Co.A and Co. B were acceptable. The log maker at company A was not cutting a number of lengths and grades which were on the cut sheet. However as the value difference between grades were quite small it had little effect on short term value.

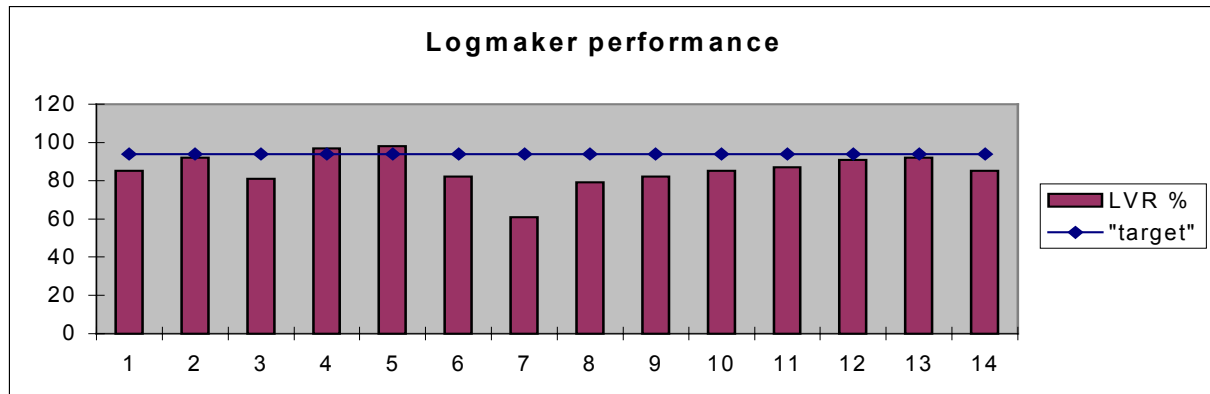


Figure 2 Logmaker Performance : “Audits of log maker performance, random sample”

As the graph demonstrates log making performance is highly variable. The more complicated the cut sheet, and the larger the differential between grades the more potential there is for value loss at log making. In the two study companies the log makers knew the grades, had appropriate tools and were being watched. Co A had a relatively simpler cut plan with fifteen grades and a flat price differential.. Co B had a complex cut plan with over 25 grades and very large price differentials.

2.3 FELLING

Interpine have completed some specific studies looking at felling and hauling damage and effect on total value.

Again using TimberTech a representative sample of stems were assessed post felling for value lost due to high stumps, draw wood, slabbing and mid-stem breakage.

The study compared the value of stems as they lay after falling, including any felling inflicted defects, with a “virtual stem” that was assessed as if it was felled at a stump height of 200mm with head breakage at 10cm.

During the study stump heights were often less than 200mm and there was little incidence of draw wood or slabbing.



As a consequence value lost due to felling damage was negligible.

Results were :

<i>Co. A</i>	<i>Co. B</i>
<i>+1.2%</i>	<i>-0.7%</i>

However we have seen some very poor felling practices in some areas. An analysis of TimberTech data over a longer period, indicates that around 1.5% - 2% of value is lost due to felling damage.

2.4 LOG MANUFACTURING PROCESS AND THE HARVEST PROCESS GAP (HPG)

After the stem is marked by the log maker, the process of getting logs manufactured, QC checked and loaded onto a truck for delivery to the customer is the Log Manufacturing Process. By having a data point at log making using TimberTech and another data point at weighbridge it is simple to determine the value loss occurring in the manufacturing process. The difference between value of logs made and value of logs delivered we call the Harvest Process Gap. (HPG).

HPG can be divided into two areas.

- A) Natural regrade. This recognises logs re-graded due to the discovery at QC of previously unseen defects. Typically these would be knots in pruned stems or maybe a large spike knot in an S grade log. Natural regrade as a % of total stem value has been measured as shown below.

<i>Co. A</i>	<i>Co. B</i>
<i>3.1%</i>	<i>3.6%</i>

- B) Process loss. This measures the value difference between logs made and logs delivered. (less natural regrade). Typically this measurement includes logs cut



too short through angle cuts, over zealous QC (if in doubt throw it out) poor sorting and making up loads with higher grade logs.

Results were.

Co.A

Co.B

0.9%

8.5%

In the case of Co.B the result has been steadily improving over time.

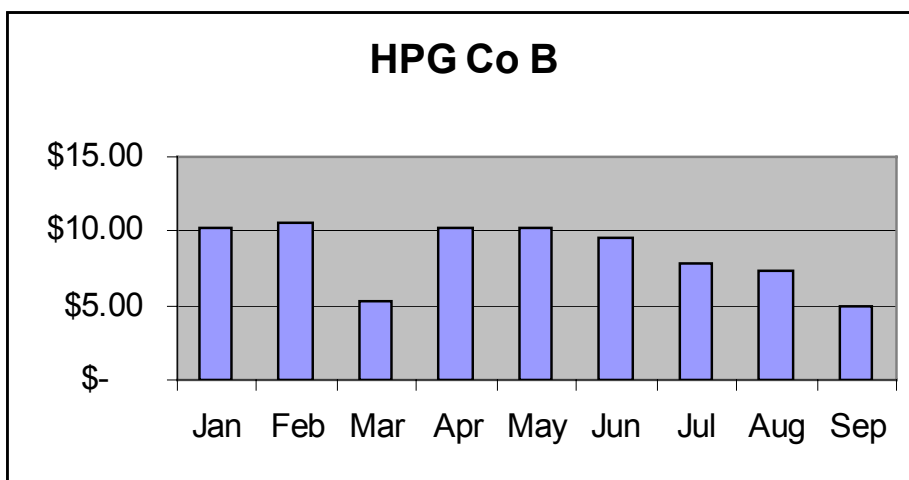


Figure 3 Harvest Process Gap : CoB has improved \$5.00m3



2.5 THE MARKET OPPORTUNITY

Typically every harvesting company will at some time or another cut a higher grade log into a lower grade product to meet a customer order. Every time that happens potential value is lost. In an extreme case a company would only cut pulp, even from a pruned stand.

If you use TimberTech (or MARVL) data and run it unconstrained over a theoretical “optimum” cut plan you can establish the optimum (virtually unachievable) value potential of a stand.

If you then run your current cut plan, with the same log values by grade, over the same data set you can establish the value of your existing cut plan.

For instance if you had only a 6m pruned log, an 11m K grade and a 3.7m pulp log on your cut plan the value created would be far less than the potential for that stand. As a lot of say, short K grade would be cut to pulp. A lot of short pruned and S grade material would end up in K 11m.

The difference between the optimum cut plan and the actual cut plan we call the Market Gap.

Using the Market Gap measure the loss was,

<i>Co.A</i>	<i>Co.B</i>
<i>6.5%</i>	<i>16.3%</i>

The market gap is the single largest area of value gaining opportunity. It is also the most difficult to manage.

A smaller operation supplying only a low percentage of a processors daily log intake has more opportunity to maximize the weekly cut plan.

When a processor cuts back log orders due to say a breakdown, the forestry co. supplying 80% of the volume gets their supply cut back first. The forestry co. supplying only 10% is likely to get a relatively smaller cut back, or even no cut back.



It seems that the larger the organization the more challenging it becomes to optimize cut plans for every crew. Especially in a centralized operation.

2.6 SUMMARY

Overall results were as follows.

	Co A	Co B
<i>MARVL said the value was</i>	<i>104% of actual</i>	<i>89% of actual</i>
<i>The potential value was</i>	<i>100%</i>	<i>100%</i>
<i>At marketing we lost</i>	<i>6.5%</i>	<i>16.3%</i>
<i>At felling we lost (gained)</i>	<i>(1.2%)</i>	<i>0.7%</i>
<i>At log making we lost</i>	<i>6.5%</i>	<i>2.8%</i>
<i>In landing process we lost</i>	<i>0.9%</i>	<i>8.5%</i>
<hr/> <i>Total value retained</i> <hr/>	<hr/> <i>86.1%</i> <hr/>	<hr/> <i>71.7%</i> <hr/>

Assuming a \$50.00m³ average on truck price, value lost for Co A is \$6.95m³.
 Co B loss is \$14.15m³.

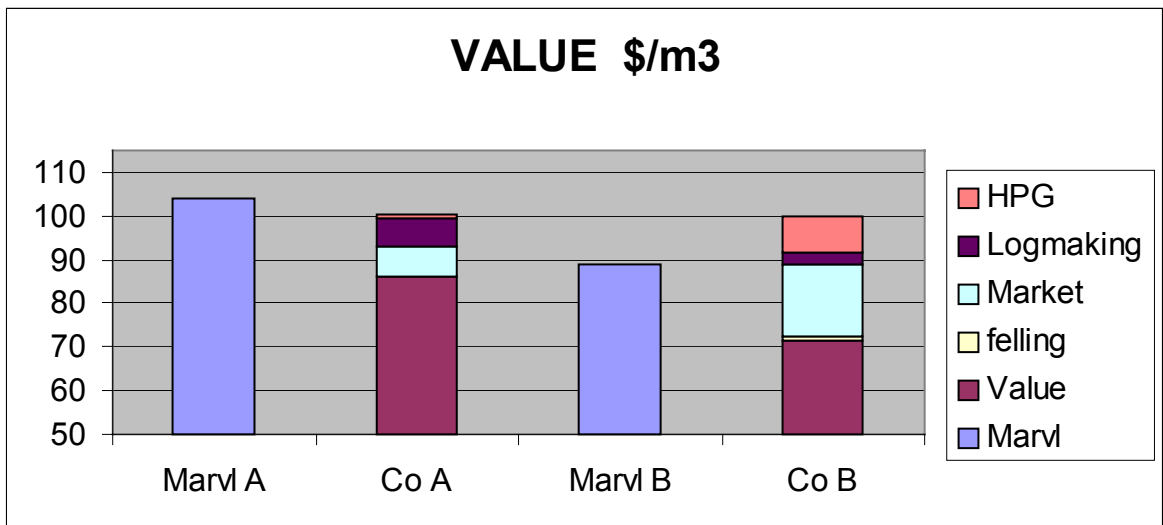


Figure 4 Value recovery across the operation : "Co A retained 86% of potential value, Co B retained 69%"



3 CONCLUSIONS

There are few similarities between company A and company B. One is a mid size “traditional” motor manual operation with long serving experienced workers, a reasonable amount of company supervision and a “value” motivated contractor. The other operation is a large superskid type contract with 650t day production and multiple sorts. Company supervision is minimal. Mostly the contract owner is absent. There is regular staff turnover.

MARVL inaccuracies can be directly attributed to training and motivation of Technicians linked to understanding and experience of MARVL by the data manager.

Market gaps are a result of a dis-connection between sales and production staff. Probably allied with a lack of production forecasting due to unreliable inventory data.

Felling damage seems to be the area of least concern. Mostly operators know what to do. They just need motivation to do it all the time.

To log make effectively you need the right tools. The results indicate that a manual log maker with attitude and motivation (and a simpler cut plan) can do almost as well as a guy with TimberTech and a complex cut plan.

Process gap is a management and training issue. Cut straight, know the specs, sort logs into the right stock-pile, don't down grade to complete truck loads etc,etc.

No amount of technology and whizz bang computer systems are going to help return maximum value if the loader driver is having a bad day and puts pruned in the sawlog stack, (and nobody notices or says anything) or the log maker doesn't know how to measure a knot.



The common theme to emerge from this analysis is that to get maximum value from a stand of trees you need to **manage the process**. Right from inventory, through cut plan design, log-making and harvest process management.

However, you cannot manage what you cannot measure. So management systems need to feed back the crucial data to those who can actually make a difference every day. This means the operators and technicians. So often in today's log harvesting environment operators, (and contractors) work in an information vacuum. With the only performance data being loads produced and the no.of logs rejected at mill.

So much of the value lost during the two studies was due to management. Or rather lack of management. And the lack of management was mostly not due to lack of effort or desire, but lack of information to direct and motivate workers.

It started at inventory. In one case the data was so poor as to be virtually useless as a planning and management tool. This flowed on to the staff setting the cut plan. Who were attempting to maximize cut plans while operating with lots of difficult to assimilate often shonky data.

At the harvesting site a lot of contractors are 90% concerned with volume and compliance issues. As long as loads are going out the gate without rejects and nobody is hurt the job is good. Mostly he has little other log data to manage the operation. Seldom is the contractor, and certainly not his employees privy to value retention statistics. Except in the broadest sense.

Because the contractor is chasing volume, while the forestry company is searching for value it is tempting to leap to the conclusion that an alignment of objectives is the key. However, the results from Co A where the objectives are similarly mis-aligned refute that logic. In the example of Co.A the areas of value loss under control of the contractor were well managed and showed a largely acceptable result. In the example of Co B areas of loss controlled by the contractor were more problematic.

In both examples there was a significant loss through market related issues. Probably stemming in part from inventory issues. Both of which are management functions. These results lead me to the conclusion that the prime area to focus on to improve value retention is management. Management at inventory, management at harvest by supervisors and contractors and especially management of market process by managers.



As an aid to that improved management I would recommend installing systems to fill the data vacuum that exists between inventory and weighbridge.

IMPROVED MANAGEMENT, USING RELEVANT, CURRENT DATA.

Donald King

GM, Interpine Forestry Ltd.



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