CONTINUOUS IMPROVEMENT AS A METHOD TO INCREASE SYSTEM PRODUCTIVITY

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ABSTRACT: As the New Zealand Forest Industry is on the edge of major increases in potential wood flows, production systems will be under increasing pressure to maintain international competitiveness. There are many ways to maintain system productivity and sustain the associated benefits. Continuous improvement, as described with a working example within New Zealands largest corporate forest owner, is a management philosophy which utilises the most valuable of resources - people. The benefits are many, and in the current economy, dovetails with any current management system reliant on the quality of it's staff.

PRODUCTIVITY - a definition

Each person may define or see productivity from a different measure. Eg Logging contractors by production tonnages, trucks by tonnes/km travelled, sales managers by $ turn over, forest owners perhaps by cubic metres of wood per hectare.

In today's NZ forestry scene, dominated by corporate activity and hence finally the share performance of the particular company, productivity is ultimately measured on the financial performance from $ resources in versus nett $ out = profit and return to shareholders.

But, before we delve too deeply, first a little reminder of just where we are.

THE ESTATE

Since those fateful days of the share market decline in 1987 considerable media attention has been given to the forest industry. Aside from being third on the export earnings list, statements like *"increased employment opportunities" "growth industry of the decade" "sustainable long term growth"* are frequently reported comments.

This is a reflection on a commodity based industry with what the share holder views as real asset backing in the form of trees as opposed to a paper based asset.

As a result of the plantation forestry planting expansion in the '60's and '70's potential harvesting volumes have increased dramatically.

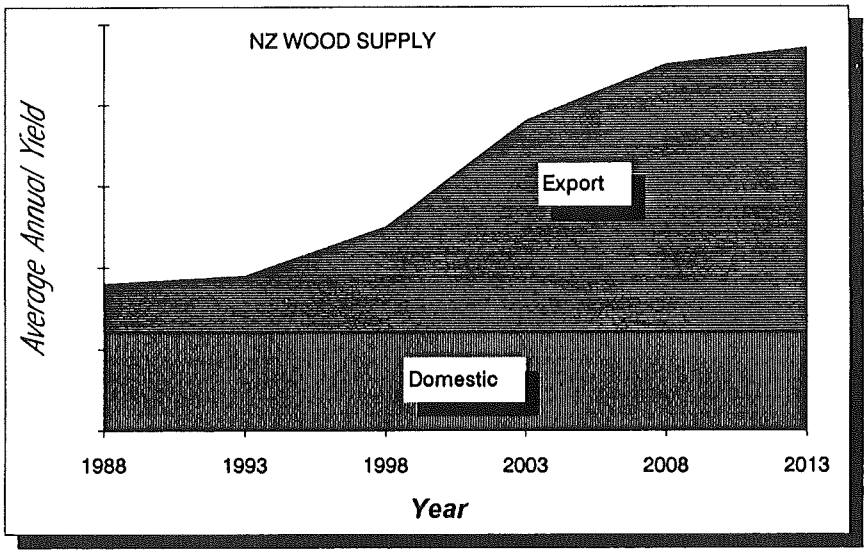

Figure 1: NZ Future Plantation Forest Wood Supply - Source NZFOA 1990

The actual cut will of course be dictated by the level of demand, export versus domestic price, and the forest owner's willingness to sell given the wide range of potential wood supply costs, tenure variations and management objectives.

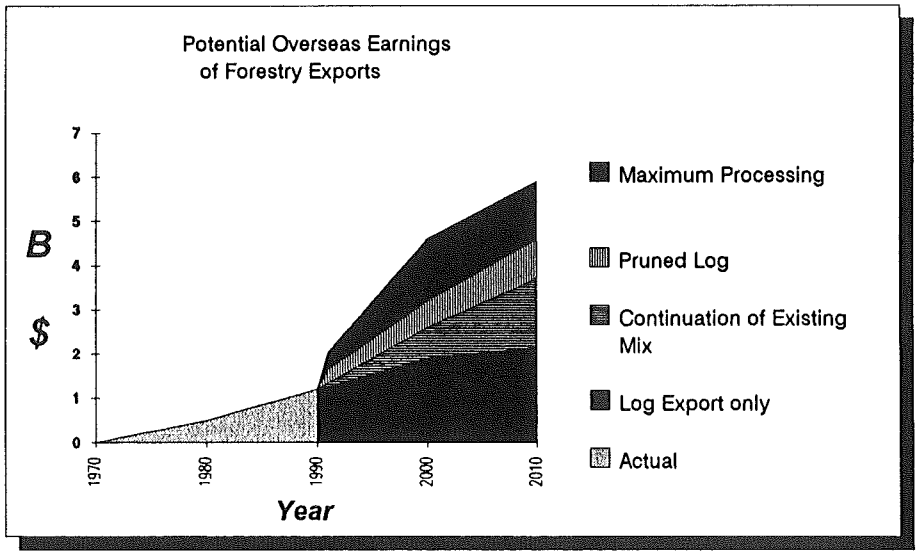

Figure 2 : Potential overseas earnings of Forestry Exports dependent on processing strategy - Source NZFOA 1992

Figure 2 well illustrates the potential export earnings given various processing options.

Without wishing to enter the debate of domestic processing versus log exporting, whatever the option taken, sustainable export growth must underpin all future wood flows.

To maintain this strategy, regardless of product type and mix, our production and processing systems must be internationally competitive and retain this edge if we are to maximise earnings potential.

THE PAST

Prior to the '80's, innovation management, driven by technology, was the dominant strategy in a fast growth, high profit margin business environment. Innovation was characterised by one-shot phenomenon, real attention getters. For example

The change from cable blade to hydraulic blade tractors.
The introduction of mechanised felling into Kaingaroa minor species.
The introduction of the rubber tyred skidder

There was a favourable climate of:

- ☺ Low cost raw materials
- ☺ Rapidly expanding markets
- ☺ Consumer orientation towards quantity rather than quality
- ☺ Sales rather than cost management systems
- ☺ A belief that success with innovative products could offset a sluggish performance in traditional operations

The 1980's and current situation is driven by the real impact of the '73 oil shock that radically and irrevocably altered the international business environment.

THE PRESENT

Today's situation is characterised by:

- ☹ Sharp, but dimishing, increases in the costs of material, energy and labour
- ☹ Over capacity of production facilities
- ☹ Increased competition among companies in saturated or dwindling markets
- ☹ Changing consumer values and more exacting quality requirements
- ☹ A need to introduce new products more rapidly
- ☹ A need to lower the break even point

Managers and contractors alike at all levels are faced with this constant market reality of increased cost of resources, stiffer competition to win customer acceptance through quality, and the need to develop more customer-orientated products and services faster than ever before.

With today's logging contractor, a delay in adopting the latest technology can be costly. Delays in adopting an improved management technique are no less costly.

While the thrust of this paper is to focus on a **Continuous Improvement** Strategy for system management it does not mean that innovation can or should be forgotten. Indeed, both **Innovation and Continuous Improvement** are needed if a system is to survive and grow.

Back to productivity.

Why improve? You might very well ask what is wrong with the status quo.

Six years ago on a pakihi skid site, very far from here, I was introduced to a hauler logging crew that at smoko time took pride in informing me that it's members had *" over 100 years of hauler experience between them"*. They were very proud that their system of work practises, methods and resultant production had been preserved for nearly three decades. Composite plastic helmets and a Stihl 051 chainsaw were the only evidence of modern technology. If the wood supply for this particular type of operation had not been exhausted they could well have been the Tuatara Loggers of the 23rd century!

However, in reality there is no such thing as a static system.

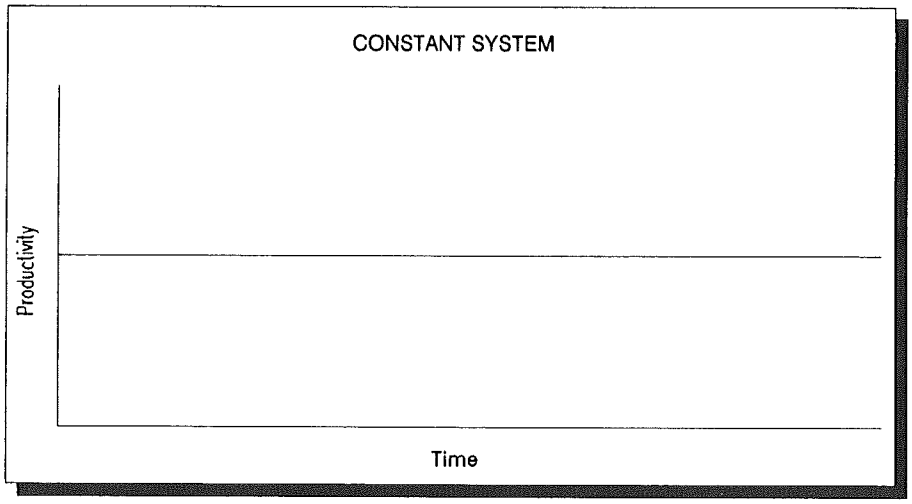

Figure 3 : Static system productivity

All systems have potential to deteriorate once they have been established.

This happens because a system, once it has been installed as a result of a new innovation, is subject to steady deterioration unless continuing efforts are made first to maintain and then to improve on it.

Without getting side-tracked a modern example of perhaps a well managed innovation strategy is found in the Swedish mechanised harvesting systems. Their enormous investment in R&D and resultant technology transfer into

harvesting machinery survives by a constant and sustained effort in support training and re-training. For example a typical machine operator can be expected to complete each year approximately 20 days training and maintenance of technology developments.

CONTINUOUS IMPROVEMENT - A management strategy

Continuous Improvement is a philosophy that does not require sophisticated technique or state-of-the-art technology. Typically an analytical approach is taken. That is an approach based on the learning from evaluation of past experience. The hardware - eg *chainsaw*, software - eg *method* and "humanware" - eg *person* is completely analysed as a system and the method by which the process is carried out is fully understood at the lowest basic level. The Continuous Improvement strategy does not call for a large $ investment to implement it. It does call for a great deal of continuous effort and commitment.

Whereas innovation is often a one-shot deal whose effects are gradually eroded by intense competition and deteriorating standards, Continuous Improvement is an ongoing effort with cumulative effects marking a steady rise as the years go by.

If standards exist only in order to maintain the status quo, they will not be challenged, as long as the level of performance is acceptable. Continuous Improvement, on the other hand, means a constant effort not only to maintain but also to upgrade standards . A feature of the system is that it requires virtually everyone's personal efforts. The Continuous Improvement philosophy is perhaps better suited to a slow growth economy, (I will leave you to decide where NZ best fit's) innovation the reverse. In a declining or static market a focus on the process *" getting it right first time"* puts pressure on lowering the break even point and hence a lower cost structure.

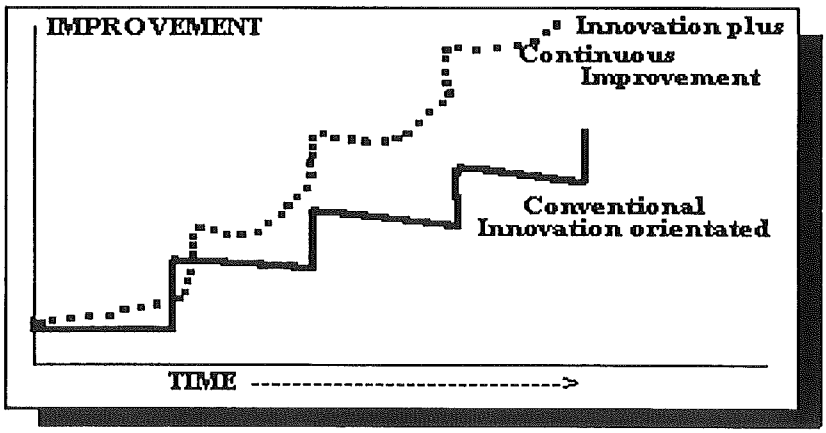

FIGURE 4: "Continuous improvement" system showing the productivity change between conventional innovation and continuous improvement plus innovation methods

Examples of this continuous improvement method at work in the logging industry could be:

- *The development of double drum winches*
- *Use of tyre chains on skidders*
- *Bunching of wood for skidder extraction*
- *Single strop and then grapple extraction*
- *Training of fallers for wood presentation*
- *Wing cuts*
- *The use of Bell's under haulers*

QUALITY CONTROL - the linkage

By following this Continuous Improvement philosophy the process of Quality Control changes. Traditionally Quality Control has started as a post-mortem inspection of defects, eg the inspection of logs at a mill or on skid prior to load out. With the Continuous Improvement process Quality Control moves back into the phase of building quality into the production processes. (And in the future building quality into the product at the time of development. For example tree breeding for certain characteristics such as branch size)

Quality Control is not just about the system as it fundamentally deals with the quality of the people The Japanese Industrial Standard (Z8101-1981) defines Quality Control as *" a system of means to economically produce goods or services which satisfy customer requirements"*. No amount of high quality raw materials - *tree*, method - *chainsaw/tape* is going to satisfy customer demand without adequate people quality - attitude/training/co-operation. Quality Control starts with training and ends with training.

CONTINUOUS IMPROVEMENT - A case study

In 1987 the NZFP Group was re-structured into separate operating business units. NZFP Forests Ltd emerged as the forestry company whose prime responsibility under a plantation management strategy was a core business of supplying log products to a variety of customers.

Traditionally log grades had been few with supplies dominated by three large customers:

- ⇨ Kinleith Pulp & Paper Mill
- ⇨ Pinex Domestic Sawmills
- ⇨ Japanese A grade export

The forests age class provided large diameter material satisfying the various customers demands for both quantity and quality.

Enter a new era.

The re-structuring also changed the business focus. Traditional wage operations were turned to contract. Harvesting was tweaked to a sustained yield level and coupled with a declining but long term managed age of clearfall and a major increase in customer base numbers, the wood supply system had to change from being supply to demand driven.

Although all sections of the wood supply system were factored into the change a major effort was put into the design, development and implementation of a quality log making system.

Managing log specifications as part of his quality system became the major issue for the contractor as a result of this expanded domestic and export customer base.

- ⇨ Initially a complete analysis of requirements was undertaken by operational and marketing staff

- ⇨ Customer requirements for log quality were translated into operational log cutting specifications

- ⇨ At this stage the Logging Training section in tandem with the depth of operational experience of supervisory staff put together the KFR Log Making School

By going right back to the basics and fully describing the operational process a training system was built which today has seen the L&FITB essentially adopt unchanged this methodology for their special skill module of Log Making thus setting an industry standard.

Along the way of implementation small changes have continued to be made : the result of interaction between the log maker, contractor, trainer, supervisor, manager and customer. A company policy of contractors having only certificated log makers to manufacture quality logs, plus regular defect reporting from both internal and external Quality Control systems has kept a focus on the "manageable margin" - the acceptable limits in a production process.

Reporting is an extremely valuable tool in the Continuous Improvement process and indeed the customer measures his suppliers ability to react to changing requirements and product defects by the quality of his data, which is in turn translated into actions.

Initially the focus for our customer base was on getting the length of logs within spec tolerance. By adopting an analytical approach to method and with the appropriate training, tangible results have been affected.

While our performance continues to rise so does the expectation of the customer. They too are under similar pressures for system improvement. While a measure of performance or trends over a period of time may be useful to say how good you are, such as depicted in *Figure 5,* and reward yourself with a pat on the back, at any one point it is purely a snapshot against a standard with no horizon.

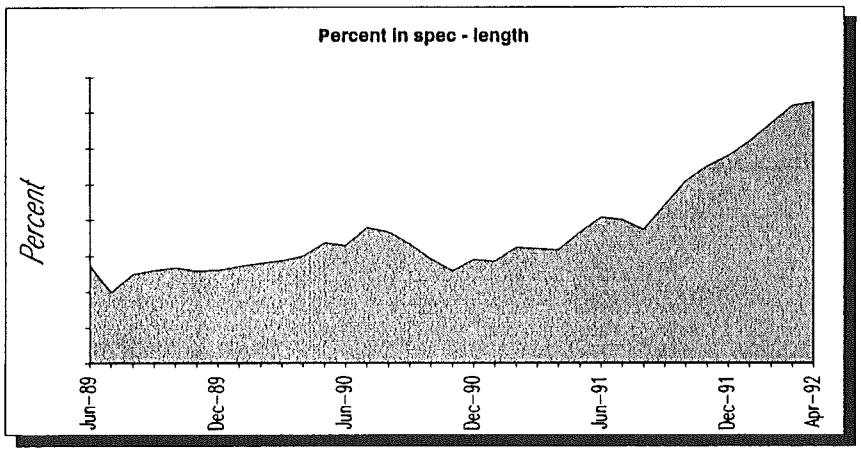

Figure 5 : Percentage of logs in specification

Reporting of the facts with real data (not perceived) is important as it is a true measure of performance. It also determines if some bias is occurring that requires specific activity. For example analysis of the logs rejected at CHH Putaruru Sawmill for October 1991 indicate the following:

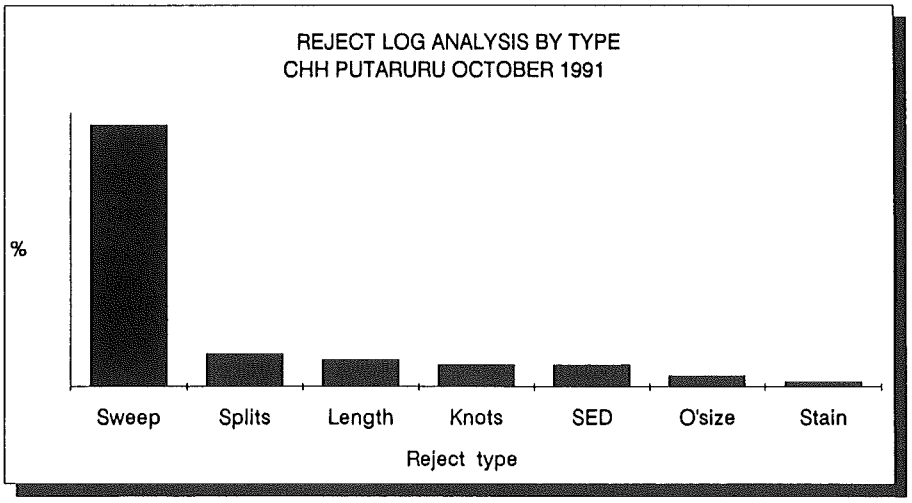

Figure 6 : Bar chart of log defects by type

Analysis of this graph indicates the focus for corrective effort must go into sweep.

By identifying specific trends by the use of data, re-training can be directed where effort is required.

Whatever the system of productivity improvement and managing this constant change to customers expectations there is no place in todays forest management philosophy for the status quo. Continuous improvement is a philosophy which places emphasis on our most inventive and resourceful raw material - people.

It is my opinion that the NZ Logger is one of the most ingenious in the world, and as such is highly placed to gain the benefits of this approach. In a combination with the correct attitude, cohesive forest management, training and re-training, system productivity is assured real growth while still capturing the benefits of technology innovation.

SUMMARY OF KEY POINTS BETWEEN CONTINUOUS IMPROVEMENT AND INNOVATION MANAGEMENT PHILOSOPHIES.

	CONTINUOUS IMPROVEMENT	INNOVATION
Effect	Long-term and long lasting but undramatic	Short-term but dramatic
Pace	Small steps	Big steps
Time frame	Continuous and incremental	Intermittent and non-incremental
Change	Gradual and constant	Abrupt and volatile
Involvement	Everybody	Select "few" champions
Approach	Collectivism, group efforts, systems approach	Rugged individualism, individual ideas and efforts
Mode	Maintenance and improvement	Scrap and rebuild
Spark	Conventional know-how and state-of-the-art	Technological break-throughs, new inventions, new theories
Practical requirements	Requires little investment but great effort to maintain it	Requires large investment but little effort to maintain it
Effort orientation	People	Technology
Evaluation criteria	Process and efforts for better results	Results for profits
Advantage	Works well in slow growth economy	Better suited to fast growth economy

(Source: The Cambridge Corporation 1989)

It can be said that:

"continuous improvement is better than postponed perfection".