

## QUALITY IMPROVEMENT TOOLS

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### INTRODUCTION

By my estimates the New Zealand forest industry wastes over \$500 million each year through poor quality. This is an alarming loss of profitability which is increasing in line with harvesting levels. I estimate that by the year 2000 the forest industry quality cost will rise to over to \$1 billion per year and that is a conservative figure. Much of this wastage is quite visible - in fact so visible that it often tends to be accepted as normal because it happens all the time.

The challenge is quite simple - do you want a share of \$500 million?

Talking about quality is one thing - doing something about it is another.

This paper will describe and explain some common quality measurement and improvement tools which are useful in forestry and processing. It will discuss how these relatively simple tools can be used to reduce variation and to improve quality. Most importantly to get a slice of the \$500 million.

### MANAGEMENT RESPONSIBILITY

80%, if not more, of the cost of poor quality is management related. To say that managers aren't accountable for felling wastage, log making or grade recovery is not acceptable. Management are

accountable for business results. To improve the results changes must often be

implemented. Changes in plans, communication, methods, processes, skills and so on. Managers must be disciplined and relentless in their pursuit for quality but first they must accept they have a very important role to play.

It is a management responsibility to identify and set in place the necessary systems and procedures to reduce the cost of quality and operate towards long term continuous improvement.

Look for example at safety in the industry. To me our safety record is appalling - we still kill, maim and injure far too many people. When management take on the challenge of quality with the same vigour and effort as they do with safety then I think we will be making some progress.

You all seem to think that quality is good - is it because you are on the bandwagon - it's the in thing. Flavour of the month. If that's the reason you're doomed to fail. Wasting your time. I've personally walked away from projects where management were paying lip service to quality. Quality is a commitment and a team commitment at that - it's a team game - it's a challenge. You can score points, beat the opposition and have a hell of a lot of fun in the process.

But who is the winner? There is only one long term sustainable motivation for quality improvement. You ultimately do it for the customer. Your whole business revolves around customers.

Managers (and this includes contractors) must base decisions on facts. The tools I will now discuss are a means of gathering facts.

### THE TOOLS

Back to the reality of improvement. Accepting that management have a lot of work to do there are some quite simple tools that can be used by management, employees and contractors alike which will help to improve quality.

In the text books there are seven basic tools of quality improvement plus seven more that are not so basic.

Many have little practical relevance. I've chosen what I consider to be simple, workable tools that can be used in the bush, sawmill, wharf or wherever. I use these tools in my project work.

### VARIATION

Before I start there is an underlying principle behind the use of these tools which you need to understand. That is, every process exhibits variation of some kind. Tree felling - not every tree has the same stump height; mechanical cutting to length - not every length is the same; kiln drying - not every piece is dried to the same moisture content. Some of the variation is natural, particularly in forestry, while some is caused the process itself. You can improve quality or reduce waste by reducing the variation - making the process perform more consistently.

As an aside I've done some research looking at the relationship between variation in forestry operations and management or supervisory cost. The results, and these are not statistically conclusive, indicate that management cost reduces in relation to reduction in variation. This suggests that a consistently performing forestry or logging contractor can operate without direct supervision. The supervisory role would exist within the contract business. There are some quite radical downstream implications in reducing variation.

### HISTOGRAMS

A simple and effective way of knowing whether your operation or process is behaving normally. You gather some information, graph it in a histogram, look at the shape and see whether things are as they should be.

Examples are small end diameters of logs - gather the data in the bush, at the sawmill, wharf and see the shape. You can compare logging crews or the total production process. Dimensions of dressed timber off a planer is another example. A histogram is a benchmark. As you carry out improvements you can compare the shape and spread of the first histogram with data gathered after you have made improvements. Basically reducing the spread of the data reflects a reduction in variation.

It's a good visual tool for what I call seeing and selling. **Seeing** the improvements and **selling** the fact that the quality approach works.

The information is easy to gather. In fact most log exporting companies gather the information already at the wharf. The

question is - do you use the information you already have?

### CHECK SHEET

A favourite of mine because it is a disciplined approach to gathering factual information.

You can develop checksheets for any process. All you need is a little thought to identify the key factors you need to check.

You simply inspect log quality in stockpiles, stems on the landing, cutover and bush activities and record what you see.

An important point is to document **why** the error occurred and **what** was done to correct the cause of the problem. Someone must be responsible for signing off the checksheet to show that the action taken was done. There is absolutely no point in wasting time collecting piles of information on quality errors if no one's going to do anything about it. The errors have to be fixed on the spot.

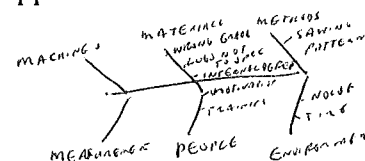
For larger companies checksheet results can be used to compare regions or for benchmarking.

### PARETO CHARTS

This is simply a graph of the check sheet showing the errors that occur the most. It's a visual tool. It identifies **priorities** for fixing errors. If the pareto charts of your processes show the same magnitude of errors over time then you haven't attacked the root cause of the problem.

The number of errors may not be a true reflection of the cost and I often convert the check sheet pareto chart to a cost pareto chart. Sometimes you get different results.

Take this log making example. Diameter errors are high but cost wise not too significant. Upgrade errors are fewer but represent a significant value loss over diameter errors. I use this approach when analysing AVIS studies.



### CAUSE & EFFECT DIAGRAMS

Probably the most effective of all the tools because it involves all the people in the process or operation. It gets focused on the root causes of problems and is an excellent team building exercise. It is like a brainstorming approach to problem solving.

A cause and effect diagram is a problem solving tool. For each major quality problem the major causes and probable minor causes are identified.

The objective is to identify all the likely causes of a specific problem.

Take this sawmilling example.

What are the possible causes of low conversions in a sawmill?

The \$500 million question is - what factors do you change?

The cause & effect analysis session will bring out some interesting and sometimes quite novel solutions. The key is to prioritise and identify the main causes, make some changes, then measure the effect.

These are all simple tools. A problem is that they are often regarded by academics

and technocrats as being too simplistic to achieve a real reduction in quality cost. They are however tools that can be taught to most people in a very short time.

They work and I can personally vouch for that.

These tools should be used as a unit, not stand alone. In other words you start with gathering data for say a histogram or check sheet, then progress through to cause and effect analysis until a solution is reached, the effect of which can be re-measured and the cycle continues.

It is an ongoing improvement process not a one off study.

A challenge with these tools is not in teaching them but in getting people to use them. Management have a responsibility in this area. Most safety programmes have planned inspections. Why not have planned quality inspections using check sheets. We do it in forestry operations already, in a fashion. In logging we could develop a simple quality check sheet which could be used by contractors or supervisors say on a weekly basis.

There are a number of other tools such as control charts, run charts, flow charts, scatter plots and experimental design and all have their place. Flow charts are very useful particularly in the auditing and investigative work our firm undertakes. The reason is that things never actually happen the way we think they happen. Drawing a flow chart of an operation can often identify where and why things are going wrong. Flow charts can be drawn of information flows, systems and procedures and are a very useful tool for improving management effectiveness.

Error reports can also be considered a quality tool. These reports document when

things go wrong. They also document **why**, **what** was done to fix it and **who** accepted responsibility for making sure it didn't happen again. I know of more than one Chief Executive who personally reads every error report for his company. Again it is a tool for measuring and monitoring improvements. If errors are repeated the root cause of the problem wasn't fixed. Over time errors are totally eliminated.

### SUMMARY

I have identified some simple and practical tools to measure and improve quality. Using the tools not only improves quality but helps to get decisions based on facts and data rather than subjective opinion. The tools don't require users to have Ph D's in statistics. They do require management commitment and training. The responsibility for this clearly rests with management.

When management, employees and contractors alike take on the challenge of quality with the same vigour and effort as they do with safety then I think we will be making some progress. This is not to say that improvements and gains are not being made now. Many forestry and processing companies have embraced the quality philosophy and some are achieving worthwhile results but we still have a long way to go. We still have to get serious.

By the way while I've been talking the industry has just lost another \$100,000.

### REFERENCES

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