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CREATING CONSTANCY OF PURPOSE

-SELECTION AND MAINTENANCE OF THE AIM-

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PART ONE

THE CRITICAL NATURE OF THE AIM

My *aim* is to defeat my competitors in the marketplace and to capture market share. Your *aim* is to work with your competitors to reduce costs in common areas; to share some of the burden of research and development and to further drive down cost to the consumer thereby creating market growth. In short, my aim is market share, and your aim is market growth. For so long as our aims are different, we will build differing business plans and organisational structures. There is neither right nor wrong until we state the aim. No policy, procedure or plan can be termed right or wrong until it is expressed in terms of the aim.

I create a pay for performance scheme that promotes competition between divisions, departments and individuals; I'm sure competition will generate optimum performance. You create a pay scheme that encourages managers to work together in pursuit of a single goal. In this case our common aim is to maximise performance. However the physical structures we create are quite different and they will stimulate different responses from people. Every physical structure implies an aim, and expresses the state of our knowledge and values. No structure, be it a pay or organisational structure, is right or wrong until we express it in terms of our *aim*, knowledge and values and beliefs.

My *aim* is to meet my monthly budget targets; your *aim* is to reduce variation in your product, service, revenue and costs figures. My *aim* is to prove that I am right; your *aim* is to open your mind to new possibilities. My *aim* is to improve the product; your *aim* is to create a new one. My *aim* is to achieve good grades in school; your *aim* is to learn. My *aim* is to hold people accountable for results; your *aim* is to improve the process they work in. My *aim* is to cut costs; your *aim* is

to improve quality. Our plans and actions are neither right nor wrong until they are expressed in terms of the aim.

What is the aim? Is it to win; is it to attract and keep customers; or is it to make profits, now and in the future? No plan or action can be judged as right or wrong until it is expressed in terms of the aim. If we choose an aim that causes sub-optimisation, no amount of effort will recover the position. Even if we survive financially, look at the wasted efforts and the customers or profits that could have been.

Alignment. Strategic positioning, operating philosophies and aims are too important for us to get them wrong very often. As David Jardin noted in a recent correspondence, achieving strategic business objectives begins and ends with alignment. If our vision; mission; strategy; aims; roles and our accountabilities; processes; systems; behaviours, etc. are not in alignment, an organization will at best limp along, or at worst, enter into a death spiral. Our aims dictate, at least in large part, our organisational structures and our plans. If our strategic positioning, operating philosophies, aims and structures are suboptimal, no amount of hard work will help much.

PART TWO – SOME AIM ISSUES

WHAT IS THE PROBLEM?

Recently, several clients have demonstrated common problems. Their people work hard...long hours are the norm. In one facility, managers and supervisors routinely work seven in the morning to until between eight and ten in the evening. All have highly developed measurement and management systems. All have departmental (or similar) targets and a performance based pay system. All have well-developed human resources processes (perhaps to the point of being over-

developed and over-complex). All have sophisticated internal technical, quality and maintenance departments. On the surface, each looks like a textbook model of a modern manufacturing company.

However, all are plagued by quality problems. In each case, production is below the nameplate capacity, sometimes dramatically. Customer service levels vary from fair to poor. The losses due to poor quality and lost production are enormous. In at least one case, market share is being handed to their competition because they can't make the facility produce much more than about half the nameplate capacity of the plant.

Quality, Maintenance and Technical people have genuinely addressed many issues, and declared these projects a success. Yet the overall performance remains little changed, if at all.

There is no single solution that will cure all the woes outlined above. However, there are three areas where all these operations have common problems. They are:

1. Significantly unstable variation in the manufacturing process and/or in incoming materials and components.
2. A lack of systems thinking.
3. Confusing multiple AIMS or lack of clarity of the AIM.

The purpose of this newsletter is to address these problems with an emphasis on selection and maintenance of the *aim*. In order to illustrate the issues encountered, several précis of meetings with managers from these corporations will be used to introduce the topic.

Maintenance manager. During a long meeting, this manager explained that he knew his priorities were not those that would best serve the corporation. He explained that by studying the maintenance costs his boss and he had arrived at targets for cost reduction. Naturally, the highest cost maintenance items were targeted. He also explained that he knew that regular but minor breakdowns in the factory ought to be his first priority because the financial losses due to lost production were orders of magnitude higher than the maintenance costs on which he and his boss had focussed. He was sure that if he focussed on these regular but minor plant disturbances that the corporation would improve its profitability by an amount far greater than if he met all his cost reduction targets. He then left me with this thought. "The Operations Manager is not my primary customer. The CEO is. Until he changes my objectives, my team will stay with our current priorities." *The Maintenance Manager's aims are not aligned with the production manager's aims. His primary aims are to keep his boss happy, to report good numbers, and to*

secure next year's pay rise. He is succeeding, but profitability figures remain flat. This is a classic case of:

1. *Misalignment of aims and processes.*
2. *Lack of systems thinking.*
3. *The boss has become the most important customer.*

Quality Manager. During discussions about the problems being faced with higher than allowed bacterial counts in a manufacturing facility, I asked how the reporting limits were arrived at. The response was that the technical people who set up the factory in the first instance calculated them based on trial data. The relevant government authority then approved these limits. If a bacterial count higher than the allowed limits is encountered, a full-scale investigation leading to corrective action is required in each instance. I studied the data used to set the reporting limits. They were reasonably stable. The reporting limit had been set at about 1.5 sigma from the centre line. Given this, it was not at all surprising that alarms were so regular. It transpired that the technical people knew this would happen. The reporting limits were set well below what were thought to be safe levels. It was done deliberately to put pressure on those working in the factory to lower the bacterial count to achieve best-in-industry standards and to give early warning of any potential problems. The actual outcome was to bury staff in an unending series of investigations triggered by random variation. *The aim of the people who set the limits was to achieve technical excellence. They are failing. The bulk of the technical people are so busy investigating random variation, they have no time to improve the process.*

Manufacturing managers. During a meeting with the managers in a manufacturing complex I asked why they kept such long hours. Most responded that the factory had significant quality and productivity problems, and that they need to put in long hours to do all the necessary work. A subsequent discussion with their boss revealed that most were rated reasonably highly. They routinely received an annual pay rise, even though factory performance was very poor. *The culture of this corporation is adverse to risk and change. In the absence of leadership to change this condition, managers receive praise and reward by working long hours. The aim of these managers was to receive recognition, whilst avoiding risk, change and therefore improvements to the process.*

Concentration Plant Manager. The manager of a plant that converts ore to concentrate (smelter feed) agreed with the conclusion that raising his costs to produce more uniform feedstock to the smelter would result in much improved financial performance at the smelter and for the corporation. However, he was loath to make such changes as his operation's financial figures would be adversely affected. *The culture of this corporation is*

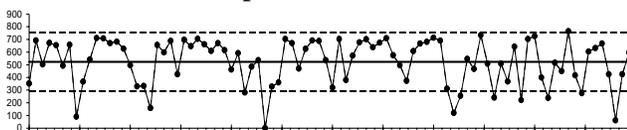
cost based and locks each manager into his or her own pigeon hole, the opposite of systems thinking. The aim of this manager is to ensure his financial figures look good, regardless of the impact on the corporate figures.

BACK TO BASICS

In each of these examples, operations were quite unstable. **The first priority should have been to stabilise the plant.** No amount of cost cutting, target setting or hard work on minutiae will solve quality, customer service and productivity problems. No amount of statistical and technical study will properly reveal causal relationships when a state of chaos exists. This hampers improvement activities.

To pursue this line of thought, let us examine one of these plants as a case study. The plant's output from July 2004 to June 2005 can be seen at Figure 1 below. At the time, managers and supervisors had nearly 300 key Performance Indicators against which their performance was measured. Plant stability was not one of them.

FIGURE 1
Plant Output Jul '04 to Jun '05

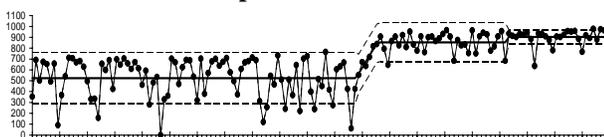


The plant operated at a daily average output of 520. There were periods where the plant could run at well over this average, about 700 per day, but this level of performance was not sustainable long term. In June 2005, a concerted effort to stabilise the plant was made. The principal points of focus were:

1. A small full-time team was established to drive the new superordinate goal.
2. Uniform inputs (raw materials, energy, tooling etc).
3. Eliminating over-control.
4. Standard set up and operating procedures.
5. Making the creation of stability the main objective for everyone (manufacturing, maintenance, HR, Finance) at the plant.

The result can be seen at Figure 2.

FIGURE 2
Plant Output Jul '04 to Mar '06



Output rose from 520 to 850 per day. In December 2005, this rose again to 900 after a technical change that was made possible by the smoother operation. Unit cost fell and quality improved. Customer service levels rose.

Plants don't always come into control this quickly, but if stability becomes the superordinate aim, and if everyone is focussed on this aim, they do eventually come into a reasonable state of control.

In this case, the difference between a struggling plant and one that is best demonstrated practice was the creation of stability. This objective was proposed to the plant in Jan '05, but the plant manager chose other cost reduction and technical options. Eventually, a more senior manager took action in June 2005, making the creation of stability and the reduction of variation the prime objective for the site.

WHAT IS THE AIM?

If the facility or process under examination is not in a reasonably stable state, nothing short of massive technology change is likely to improve productivity, quality and customer service levels unless the process is stabilised. This is unlikely to happen unless senior managers make it the principal aim. In over twenty years of consulting, I have never seen a plant come into control unless the plant manager, and/or his or her superiors, made the creation of stability a primary objective. Nor should we expect anything else.

Perhaps the maintenance of stability needs to be at the top of the priority list even after reasonable statistical control has been established. At one facility, a six month project to create stability resulted in a profit increase of over thirty million dollars per year. Three years and two managers later, the plant was once again in a state of chaos. One by one, damaging changes that looked like attractive cost reduction activities were made. Many of these added variation. After a while, the additional variation cumulated until the plant descended into a state of chaos. Fortunately, senior management eventually took action to restore the situation, but one is inclined to wonder what the financial losses were.

There is little point in conducting mass training and then asking people to sally forth and do battle with variation. Only a focus on reducing variation by senior managers, who know not only what to do, but also how to do it, has been seen to work predictably. As Dr. Deming was fond of saying, "Only action by management will bring about the transformation".

For hundreds if not thousands of years, young officers in training have been taught that the first principle of war is, **Selection and Maintenance of the Aim.** After strategic positioning, the creation and maintenance of stability

should be an overarching primary objective of manufacturing; part of the operating philosophy.

If an unstable operation is brought into a controlled state, we may anticipate an increase in volume throughput (in accordance with Little's Law) and/or an improvement in quality.

If a reasonably stable operation allows changes to occur that increase variation, we may expect the opposite effect, but why and how does this happen?

PART THREE SYSTEMS THINKING AND AIMS

Business is concerned with profitability. If one can reduce costs, profits will increase **provided revenues and quality remain unchanged**. Unfortunately, it is common for a cost reduction activity to have negative effects on revenues or quality, sometimes in a different part of the process.

FIRST CASE STUDY

At a metallurgical smelter, cheaper alternate fuels were introduced. At the outset, the cost/benefit figures looked good. Waste oil, low grade coal waste and eventually several other sources of alternate fuels were introduced. Unfortunately, insufficient quantities of any of the alternate fuels were available to allow continuous feed of these fuels. They were regularly turned on and off. This introduced thermal variation into the process to the point where occasionally it descended into a state of chaos. Quality suffered to the point where the production of out of specification product rose alarmingly. Volume throughput fell. Initially, this loss of volume was not an issue because the plant had spare capacity. However, when the market demand and the price both dramatically lifted, the plant was unable to produce the additional tonnes and drive down unit costs. Significant profit opportunities were missed.

Creating and maintaining stability never became a primary objective at this smelter. Instead, the focus was maintained on cost reduction in functional areas. The process remained unstable because of thermal upsets, but the energy costs looked good.

SECOND CASE STUDY

At another metallurgical site, ore was treated in two stages. First a mill converted ore containing three to four percent metal to a concentrate containing twenty five percent metal. Secondly, this concentrate was fed into a smelter where the base metal was produced. The smelter performance was poor. Costs were high, out of specification product was common and volume throughput was below nameplate capacity. Millions of dollars were spent trying to rectify the problems

encountered. The improvements achieved did not justify the capital expended.

Eventually, the focus was shifted to the mines and the mills. The concentrate produced by the mills was unstable and highly variable, because the ore itself was highly variable. After some trials, the process was altered by eliminating some ore sources and introducing significant blending pads to blend the ore before it entered the mill. Each blending pad could be significantly different from the previous blend because the miners were drawing ore from a different part of the ore body. However, because the metallurgists at the mill were aware of these changes in advance, the variation between blending pads caused only minor issues. The benefits gained by operating for about a week at a time on uniform ore were significant. Mill output rose and the concentrate produced was vastly superior. There was, however, a significant cost to achieve this result, not all of which could be justified by the improvements at the mill.

The smelter now had reasonably uniform concentrate feed. Very quickly, energy costs fell, tonnes throughput rose and quality vastly improved. When the mine, the mill and the smelter were examined as a system, the cost of blending the ore was insignificant compared with the benefits gained.

SUMMARY

The vast improvements in smelter performance noted above were a consequence of a shift in the primary objective. In this mature operation the primary goal had for some years been cost reduction and the resolution of certain issues from a technical standpoint, within functional boundaries. The initial statistical study revealed instability and a high level of process variation. Once the focus was taken away from cost reduction and placed on the achievement of stability, different variables were cast into the spotlight. It soon became clear that operations at the mill would remain unstable until the inputs were stabilised. Once this was done, positive results flowed through the entire system.

It is noteworthy that the decision to switch the objective to the creation of stability was not made by the mine, mill or smelter managers. It was made by the General Manager. The corporate organisational and financial structures focussed these managers on their own operations. In this case the costs of blending the ore were borne by the mine and the mill. Initially, the managers of these operations were loath to authorise such changes because the bulk of the benefits would accrue elsewhere. Action by the General manager was necessary to examine the proposed changes in light of their effect across the entire system.

Interestingly, if the corporate culture had been one where the creation and maintenance of stability was paramount in all operations, this case study could not have existed. Such a culture is common in Japanese industry. Under such a regime, every proposed change is examined to determine its likely effect on process and product stability very early in any study. If a proposal is deemed likely to increase variation, it is unlikely to succeed unless the cost saving opportunities are very large.

A friend and business associate, Mr. Ross Elliott, noted that Sumitomo Metal Mining Company was exceptionally good at formulating strategies and aims as well as an operating philosophy. At Toyota, the major *aim* selected for the year applied to everyone, from the CEO to the janitor. Conquering variation was not something people in these companies spoke much about. It was embedded into their thoughts and actions; they had achieved unconscious competence.

In Australia and the USA, the business culture is cost driven to a large degree. Cost reduction is not a bad thing. However, if we introduce changes designed to reduce costs and in the event we actually increase variation, we can find that the overall effect of a cost reduction activity is to increase unit costs and/or to damage quality. Usually, it is not a single cost cutting activity that does the damage. Rather it is the cumulative effect of several such changes that more commonly drives up variation and overall costs. It is axiomatic that the cost of liberty is eternal vigilance. It is not so widely understood that a similar standard of vigilance is the cost of stability.

CONCLUSION

There is more to achieving good quality, high productivity and low unit costs than ensuring that all managers have a set of coherent objectives, but their absence leads to the type of problems noted in Part 1 of this newsletter.

Most businesses lack an operating philosophy that successfully guides all managers and the processes and structures they create towards productivity and quality on a systems basis. There is neither right nor wrong in our world until the subject under examination is couched in terms of the *aim*. If we have divergent or confusing *aims*, or if we lack an operating philosophy, we can expect cost, productivity and quality problems.

The first of Deming's Fourteen Obligations of Top management is **Create Constancy of Purpose for Improvement of Product and Service**. It's a pretty good guess that he chose this as his first point for very good reasons.