A PREREQUISITE TO SUCCESS

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The success of just about any system, be it quality or environmentally related, requires the commitment of management. This is generally accepted and well documented in all management related text books. But what is meant by commitment and just what is management's role in order to achieve commitment?

A famous quality professional, Dr. W. Edwards Deming, has encapsulated management's role in his 14 points for management. These points are the basis of this discussion.

WHO IS DR W. EDWARDS DEMING

Dr. W Edwards Deming, born in Iowa 1900 and died in Washington 1993, was perhaps the most successful quality professional in the world as he has played a major role in empowering the Japanese to capture world markets in just a short five year period.

His achievements include, but are not limited to, the following;

- ◊ Distinguished Career in Science Award - 1988
- ◊ National Medal of Technology - President Reagan 1987
- ◊ Samuel S. Wilks Award - ASA 1983
- ◊ Second Order Medal of the Sacred Treasure - Emperor of Japan 1960
- ◊ Doctorate in Mathematical Physics from Yale - 1928
- ◊ 17 USA Universities awarded Deming the degrees LL.D. and Sc.D.
- ◊ Japanese National Award named "DEMING PRIZE"
- ◊ Authored numerous books and 171 papers.
- ◊ 1950 - 1970 he trained 14700 foremen and many thousands of engineers and managers.
- ◊ 1980 - 1993 his four day seminars reached 10000 people a year for over than ten years
- ◊ Japanese captured world markets in just 5 years.

I believe we in South Africa have by and large misunderstood Deming's points and therefore have never been able to apply them with any success. A vital element towards understanding his message the understanding of 'Common Causes of Variation' also known as System Variation and 'Special Causes of Variation' known as Assignable Variation.

UNDERSTANDING A SYSTEM OR PROCESS

First let us define what we mean by a System or Process. A "System or Process" is any set of Conditions, or set of causes, which work together to produce a given **RESULT.**

We usually think first of a series of manufacturing, machining and assembling operations which result, for example, in the production of cable, electron tubes, relays, switchboards and other apparatus or equipment.

However, since the word "Process" means a system of causes, a process may be far simpler than the ones mentioned above, or it may be far more complex. For example:

- The output of a single machine, or a single fixture or element of a system.
- An assembly operation, or a single motion performed by a human being.
- A method for using test apparatus / equipment.
- By-product produced by a manufacturing.
- The act of typing (or performing any clerical operation).
- The parts per million of a substance in a concentration.
- Etc.

MEASURING A SYSTEM OR PROCESS

Lord Kelvin often made the following remark;

"I often say that when you measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your Knowledge is of meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science, whatever that may be."

It is imperative that we measure our processes numerically, not just the quantities produced either.

What do we need to know about our processes?

- An understanding of the process, the inputs and their effects as well as the controls and adjustments
- How to measure it and express it in numbers
- The steps necessary to analyse when the process is "IN" or "OUT" of control

The understanding of Variation is known as 'The System of Profound Knowledge' and as such highlights the importance of understanding these simple concepts.

UNDERSTANDING VARIATION

A system can be explained by the following model (figure 1), highlighting the fundamental inputs which when processed result in some output.

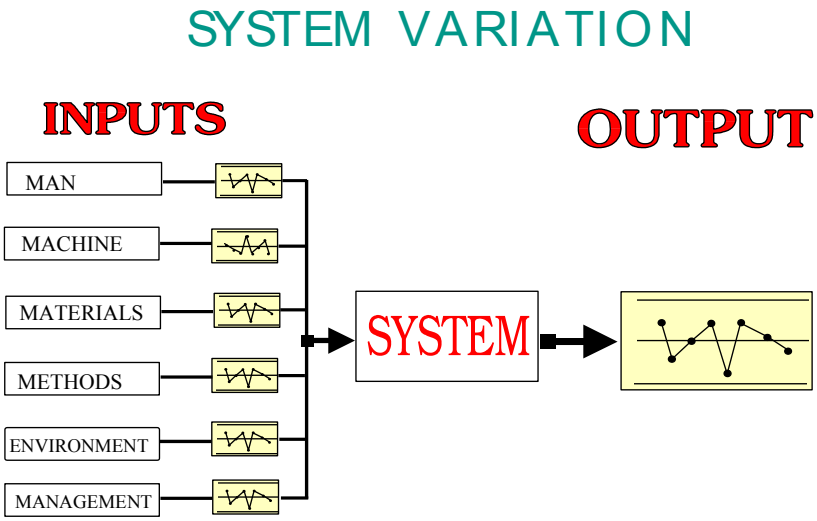

Figure 1: Model of System

Each of these input elements vary within themselves and it stands to reason that unless abnormal factors have an influence, each of these elements will vary within it's own as natural limits. Since the output is influenced by all these varying input elements, the system output itself will also vary within some natural limits as demonstrated in figure 2.

When a system or process varies within its natural limits the reasons for such variations belong to the system and as such are known as **SYSTEM or COMMON CAUSES**

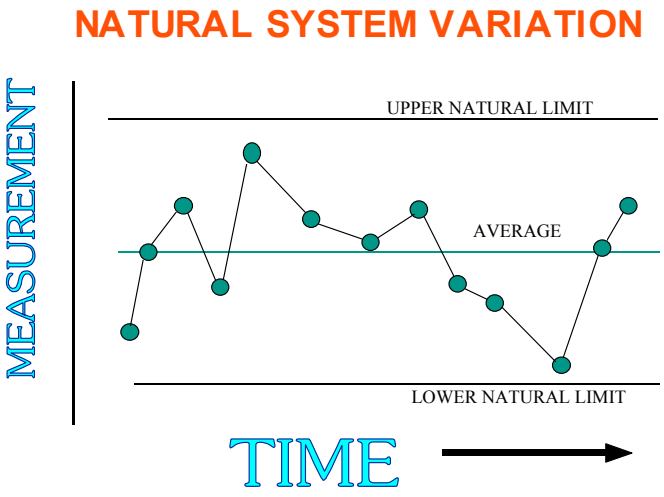

Figure 2

Should however one or more of the input elements change due to abnormal or unnatural circumstances it stands to reason that the system output will also reflect this change. This unnatural variation is known as 'SPECIAL' or 'ASSIGNABLE CAUSES', as the reasons for the abnormal variation can be assigned to a specific cause or reason.

When assignable causes exist, then the input elements of the system will vary outside of their natural limits causing the system output, as reflected by plotted measurements, to also vary out of its natural limits in an unpredictable fashion

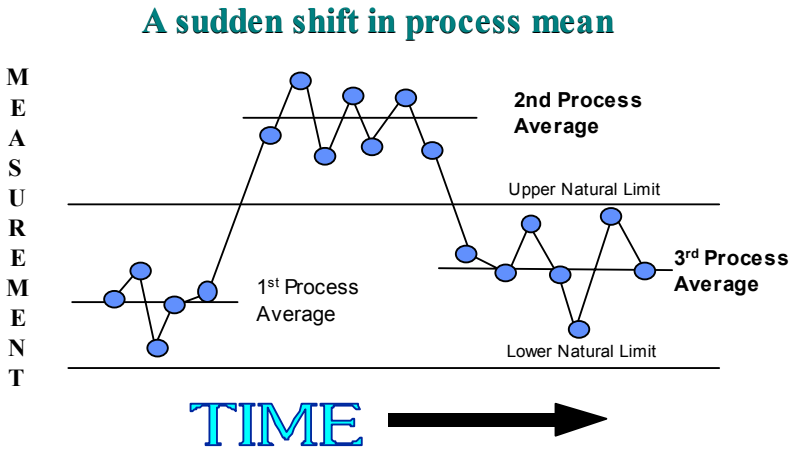

Figure 3

Two main reasons exist for an out of control situation, the process is unstable (process is shifting continuously as demonstrated in the figure 3) or the process becomes incapable due to the increasing variation of the System (figure 4).

ASSIGNABLE causes of

A steadily increasing variation

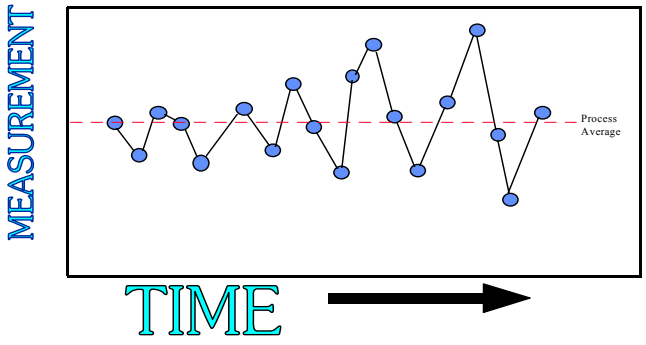

Figure 4

APPLYING THE VARIATION CONCEPT TO LIFE

In order for us to know anything about a golfer we would have to measure him and express this I some sort of number. This is done by counting the number of strokes required to sink the golf ball per hole as well as the overall strokes for the day. If we were to plot the results we may well find the following:

Figure 5

FAMOUS PHRASES OF DEMING

"If I had to reduce my message to a few words, I would say it's to reduce variation"

"Quality is determined in the boardroom not the shopfloor."

"Education in simple but powerful statistical techniques is required of all people in management."

DEMING'S 14 POINTS FOR MANAGEMENT

1. Create constancy of purpose for quality of product and service.
2. Adopt the 'New Philosophy' - we are in a new economic age.
3. Cease dependence on inspection as a way to achieve quality.
4. End the practice of awarding business on the basis of the price tag alone.
5. Improve constantly and forever every process of planning, production and service.
6. Institute on the job training.

7. Adopt and institute leadership.
8. Drive out fear.
9. Breakdown barriers between departments.
10. Eliminate slogans, exhortations and targets for the work force.
11. Eliminate numerical quotas for the work force and numerical goals for the management.
12. Remove barriers that rob people of pride of workmanship. Eliminate annual rating or merit systems.
13. Institute a vigorous program of education and self improvement for everyone.
14. Put everyone in the company to work to accomplish the transformation.

A FOCUS FOR THE MANAGEMENT

Although all the 14 points are for management action I have selected the following points for discussion as they help us understand the management commitment required the for implementation of a system or process.

1. Create constancy of purpose for quality of product and service.

Top management must declare an unshakable policy for Quality and Productivity. This policy must become an institution and top management must provide the road map towards its accomplishment. Top management often have difficulty in designing the road map for achieving this policy. Study of Dr. Deming's book: "Out of the Crisis" should become one of top management's priorities.

Management continually change their priorities and policies in order to suit the directors and shareholders. Most of this is caused due to short term profits. Directors and shareholders look at year end profits. Anyone can boost the dividend at the end of the quarter. Ship everything on hand, regardless of quality: mark it shipped and show it all as accounts receivable. Delay placing orders, for as long as possible, on materials and equipment. Cut down on research, training and education.

Part of South Africa's industrial problems is the objectives of its corporate managers. Most executives think they are in business to make money, rather than products and service..... The Japanese corporate credo, on the other hand, is that a company should become the Worlds most efficient provider of whatever product and service it offers - once it becomes the world leader and continues to offer good products: profits follow.

2. Adopt the 'New Philosophy' - we are in a new economic age.

Most South African industries, with few exceptions, produce defective products and services which if correctly measured and costed can easily amount to 25% of the cost of sales. This is an incredible cost. In fact in a recent Sunday Times newspaper, South Africa was recently rated 45 out of 46 countries for productivity.

Management cannot afford to accept errors, defects and waste as a way of life. We can no longer expect to be competitive and maintain a high standard of living if we are prepared to accept errors, reprocessing and rework in manufacturing and service industries. The following points address the new philosophy if we want to stay in business:

(a) Do not deprive the worker of pride of workmanship, and then blame faults of the system, for which you are responsible, on him.

(b) Do learn new methods of supervision and training.

(c) Alternate plans in expectation of delays, errors and defects, are costly and no longer acceptable. One such example is traceability requirements.

(d) The cost of a defect will in almost every case, by far exceed the cost to produce a good item.

(e) Do learn that Quality cannot be improved if the objective is to produce to specification.

(f) Do learn how to distinguish between faults of the system and special faults. Use this theory in your approach and application of supervision and management.

(g) Do realise that some of the traditional economical and statistical theories do not work in the modern environment of production and services. Free competition does not enhance Productivity or Quality, nor can modern products be purchased on the basis of price alone.

Obstacle: Belief in visible figures with little regard for those figures that are unknown and unknowable

Managers are taught to read and interpret financial statements and other visible figures as a tool for managing. Managers often look at production figures, figures on quality, safety, sales, etc., and take action on such figures without knowing whether the problems they are looking at are causes of the system, or special causes. Without this knowledge correct interpretation can only be achieved by luck. Managers are not taught how to distinguish between

special causes and causes of the system; a vital requirement if one wants to take the correct path towards improvement.

I have yet to see reports on scrap, defects or other quality control information that contain any trace of whether the problem is a systems cause or a special cause. Information that will provide a guide to management for the correct action. Customer returns, defects, scrap and rework are costs that are unknowable; lead to a loss of sales, loss of available work space, extra administration, labour frustration, customer dissatisfactions and many more unquantifiable losses. What management should do is not to look at useless figures on the above, drawing useless conclusions from a conglomerate of these figures, but provide a road map to the continuous reduction of such losses.

5. Improve constantly and forever every process of planning, production and service.

Find problems. It is management's job to work continually on the system. This includes, design, incoming materials, composition of material, maintenance, improvement of machine, training, supervision, retraining. There must be a plan and organisation for continual improvement of quality and productivity in all aspects of the business.

Failure to understand what a manager needs to do and know

1. Common belief has it that management need not possess substantive or technical knowledge, and need not understand problems of design and production. It is believed that a good manager in one place can be a good manager in any place. This is often taught in schools of management.

2. There is always talking about how to get employees involved with quality and productivity. We hear and read this daily. The real problem is how to get management involved with quality and productivity. Management are the ones who have to remove the barriers that stand in the way of quality and productivity improvement. Unless management become actively involved with quality and productivity, nothing much is going to happen.

3. Management must remove the barriers between departments, remove fear, remove the obstacles that stand in the way of the worker of having pride in his work. However, instead of doing these things, management insulate themselves against these problems, and ensure that they are hardly ever reached.

4. Management are taught how to negotiate and manipulate instead of how to provide road maps that will lead to greater and greater quality and productivity. We cannot learn to be a good manager by going to a business school, rather than good management can best be learnt by working for a master and learning from the master on the job; getting paid while you learn.

Good management is somewhat like a good tradesman. He has learnt the trade from masters of the art whilst working for them.

5. Another problem is that management believe in instant solutions. Once they have given an instruction for something to be done, they believe that everything will happen, and are not only surprised when things do not turn out as they expected; but blame the failure on their subordinates. Management must realise that quality and productivity improvement is hard work, and particularly on their part. After all, they have so much to do that only they can do.

8. Drive out fear.

No one can put in his best performance unless he feels secure. *Se* comes from Latin, meaning without, *cure* means fear or care. Secure means without fear, not afraid to express ideas, not afraid to ask questions.

The worker is often blamed for poor performance results thus further straining the already fragile relationship between management and worker. If I had a Rand for every time I have heard a manager state "if only they (the work force) would do as they were told and apply themselves, we would not have these problems", I would be a rich man today.

The late Dr. W. Edwards Deming explains that management are responsible for 85% of the reasons for scrap, rework and poor productivity and the worker is (at worst) only responsible for 15%. This is quite true but unfortunately our work force are blamed for all the errors regardless - Most South African management are ignorant to Deming's teachings and they do not want to hear statements like those in the previous sentence.

10. Eliminate slogans, exhortations and targets for the work force.

Slogans to the rank and file asking them to improve quality, productivity or safety, have never helped anyone to do a better job. What is needed is not exhortations, slogans and goals, but road maps to improvement - management's responsibility.

11. Eliminate numerical quotas for the work force and numerical goals for the management.

Work standards do not include any trace of a system by which to help anyone to do a better job.

Work standards and budgets for scrap and defectives are inefficient and lead to low productivity

Some examples of goals,

- Decrease costs of warranty by 10% next year
- Increase sales by 10%
- Improve productivity by 3%
- Reduce scrap by 3%

If you have a stable system, then there is no use in specifying a goal. - You will get what the system delivers.

If you don't have a stable system, then again there is no point in specifying a goal - no capability.

CONCLUSION

If management do not understand the concept of variation, and therefore lack the 'System of Profound Knowledge' it is impossible for the fourteen points to be implemented correctly. Management are at risk with there decision making. With the Profound knowledge management can better plan production, knowing the statistical capabilities of the machinery. Management can also determine the difference between management controllable errors and worker controllable errors, a prerequisite for success. Without Profound Knowledge failure is a certain destiny, take the failure of Quality Circles in the west. If we examine the model for the System it is simple to see that management are in fact responsible for 85 % of the system and the workers only 15%. The Japanese plotted statistical charts for 10 years, changing the ratio to 85% worker and 15 % management, before implementing Quality Circles.

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