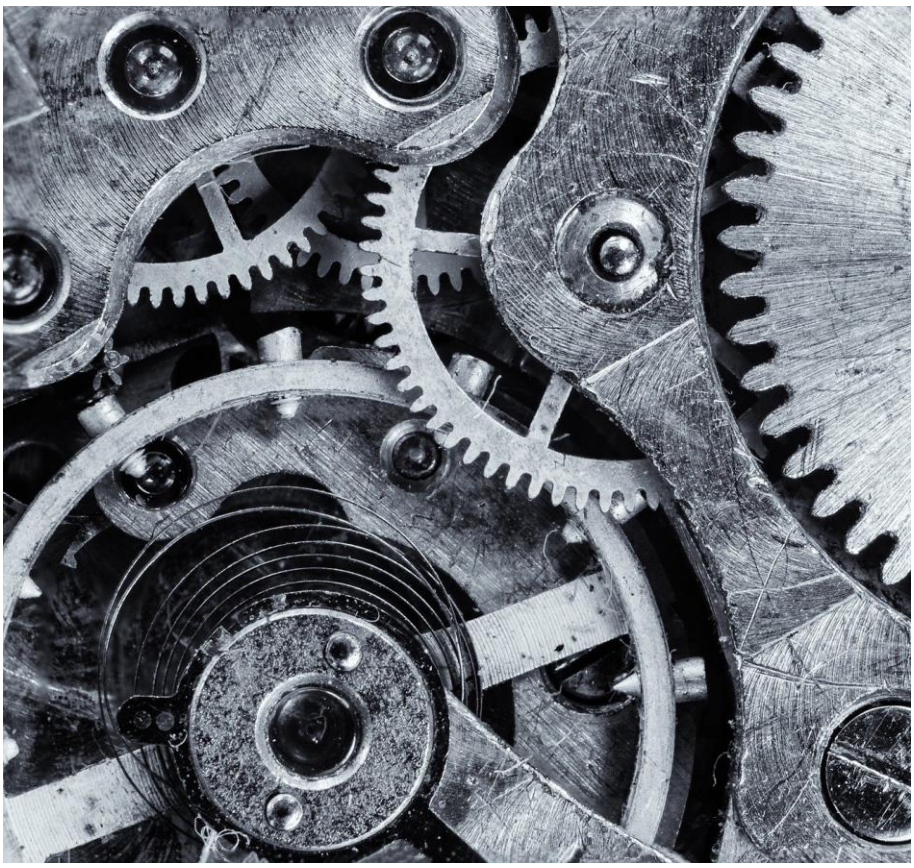

General Topics – The Manager's Toolkit

TANGRAM TECHNOLOGY

Consulting Engineers

Tangram Technology Ltd.

33 Gaping Lane, Hitchin, Herts., SG5 2DF

Phone: 01462 437 686

E-mail: sales@tangram.co.uk

Web Pages: www.tangram.co.uk

General Topics – The Manager's Toolkit

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Part 1 – The basics

1. Re-engineering the company

Today's complex business situations demand more sophisticated thinking methods and techniques, these techniques are the tools of the manager's trade and here we look at some of the new tools and to use them.

We have heard it all before, haven't we? In the early 80s we had Quality Management and ISO 9000, in the late 80s we had Total Quality Management (you should have got the T-shirt for that one by now) and yet somehow neither of these approaches delivered all the benefits that were promised.

Still, as we tried to implement them, there was a feeling that we were missing something; that we needed an extra edge to guarantee success. There was a glimmer of hope that perhaps we could yet stumble onto the right road. We put systems in place to manage the business – not just product quality but the whole business. The problem was that it didn't really provide any methods for getting better at what we did.

Total Quality Management extended the concepts further to involve the whole company and to introduce ideas about customer focus and improving the company. It provided some ideas for how to get better, but we had to invent most of the structure as we went along.

Now we have the idea of Business Process Re-engineering (BPR) that takes us further along the road. The idea of BPR is that we re-define our business goals and then devise the systems and tools to support the goals. The concept is simple. Our business systems grow with the company and then become fixed in place (by ISO 9000 sometimes) while the company is still changing. The systems then begin to lose contact with the real world no matter how much you try to make them fit and work whether by using TQM or other ideas. There eventually comes a time when the whole system needs to be redesigned to make it work at all. In order for this to work you need a definition of what the company is about and a clear set of goals.

2. What are we here for?

There is a new vision developing that the company should be seen as a structure for adding value to either the product or the service.

The rise in the use of contract workers (from fitters to managers) means that the core of permanent employees in most companies is shrinking and that we have to change our way of doing things. We must all ask ourselves 'What have I done today to add value to the product or service?' If the answer is 'nothing', then start worrying or keep reading.

Business Process Re-engineering defines the core processes of the company that truly adds value to the business. These processes are then engineered, defined and accounted for so that the added value for the business is maximised. The systems approach of the computing and quality people is being applied to the whole company with the specific aim of adding value. In many cases this involves down-sizing or delayering, but if the process can never add value then it should be disposed of. Before we can start the BPR we need to be able to measure and define what we want to change. To do this we need a set of tools for the job.

3. Thinking and analysis tools

The manager's tools of his trade are thinking methods and techniques and every so often, like any other tradesman, he needs to renew and maintain his tools. This series is a manager's toolkit' and describes some tools that you may not have come across before. They will serve you well, provided you choose the right one for the job. No one would attempt to cut wood with a screwdriver, so you would not be wise to use Pareto analysis when Ishikawa is the best tool.

Effective business decisions are based on thinking, facts and analysis and the toolkit is essentially a collection of techniques for thinking, fact gathering and analysis.

Before studying the actual techniques, some points should be made about the general use of the tools.

4. Visual management

There has been a history in industry of keeping information away from the workforce and of being surprised when they do not act in a responsible and sensible manner. Visual management gives the workforce information and they can then act in the required manner.

The theory and practice of visual management is that 'what gets measured (and displayed) gets done'. Alternatively, people do not act as you expect but rather as you inspect.

The practice is simple: display targets and performance data in as visible a place as possible and update this regularly to show achievements (or failures). Information displayed can be production targets, quality targets and achievements in both areas. The important thing is to ensure that the information is widely displayed, is visible to all personnel, and is relevant to the goals of the company.

Accuracy

There is a tendency to assume that accuracy of any information is improved by as many numbers as possible after the decimal point. In discussing figures, round numbers are more easily remembered than spurious accuracy. For management and many other purposes, the word 'about' should be used frequently:

- No of frames last week = 243.
- No of frames this week = 289.
- Increase = 18.93%.
- or ABOUT 20% increase

Which number best focuses your attention on the real issue?

5. Sampling sizes

In making any statement where samples have been taken, then beware that a small sample may not be representative of the whole. It would be unrealistic to try to assess the average age of the UK population by asking five people in the street on a weekday their age. Most school children are at school; workers at work; and so on. Your sample is not representative and your average would be well adrift of the correct number.

For any sample to be significant then there must be a minimum number of articles, or people, or tests made. Be warned – Making a judgement based on a sample size of 1 is not only foolish but downright dangerous.

6. Controls & benchmarks

When using visual management or any other technique, there is a need to clearly set targets. In the same sense, controls and benchmarks need to be set for any proposed change in a process or system. These need to be agreed and communicated before any change is made to the system.

7. The choices

'Act in haste, repent at leisure' should be remembered when presented with a business decision. Try not to get your only exercise by jumping to conclusions.

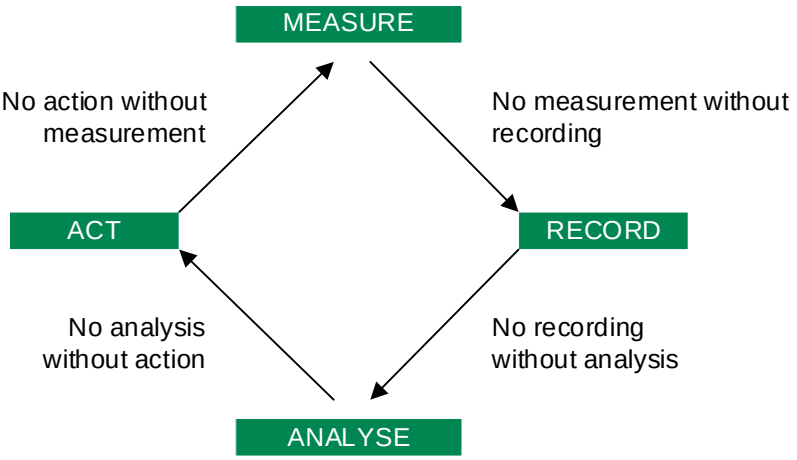
When presented with two options by anyone then it is wise to investigate the third and other options – do not limit your opinions too early as this can drive you down the wrong path.

As a general rule it is best to try to adopt the 'helicopter view' of a situation first – standing back from the problem and looking for the root cause rather than the immediately apparent (and often wrong) effect.

Once you have located the real culprit then it is time to switch to the 'searchlight' method to determine the correct action. Other tools in the kit will help you to do this.

8. The action model

The action cycle for any business situation should be based on the action model:



The Action Model

The toolkit methods are designed to enable you to use and implement the action cycle into your business.

This series will not make your business better; only you can do that. What the series will do is introduce a range of techniques and tools that can be used to make your business better, but they will only be useful if they are used. As the photocopier serviceman once said to me: 'It works much better if it is switched on.' The tools will allow you to define and improve your business, but numbers will never be a substitute for your judgement, no matter how detailed they are. At the crunch time remember:

'At times we must engage in an act of faith that key things are do-able that are not provable. Too often our expectation level is too little compared to what is possible.' – Robert Galvin, Motorola.

General Topics – The Manager's Toolkit

Part 2: Looking after your vitals

1. Pareto charts

In the second of this series of articles exploring the new thinking methods and techniques, or tools of the manager's trade, we examine how to make the best use of the Pareto principle; sometimes known as the 80:20 rule and often generalised as 'the vital few and the trivial many'.

In any business it is essential to separate the 'vital few' from the 'trivial many' and Pareto provides us with a way to find and identify those 'vital few' that can really make the difference to the business. It really is looking after your vitals.

The Pareto principle is named after the Italian economist Vilfredo Pareto (1848-1923) who studied the distribution of wealth. He found that wealth was not evenly distributed and that a few people controlled most of the wealth. Things have not changed a lot since then and his findings apply just as much to Britain today as they did to Italy in the 19th century.

The rule was generalised by Juran (the quality guru) who also coined the phrase 'the vital few and the trivial many' to describe the Pareto principle. The Pareto Principle or 80:20 rule can be applied to all areas of business and is used to focus on the real problems or issues. In essence the Pareto principle is a means of separating the vital few from the trivial many. To give some examples:

- 80% of your sales volume will come from 20% of your customers.
- 80% of your call-backs or remedial work will come from 20% of your installation teams.
- 80% of your profit will come from 20% of your customers.
- 80% of the defects will be in 20% of jobs done.
- 80% per cent of the time taken off for sickness will come from 20% of your personnel.
- Or even a few wilder ones:
- 20% of the people will commit 80% of the crimes – maybe that is not so wild!
- 20% of the planets have 80% of the mass in the solar system.
- 20% of the biological species account for 80% of the animal mass on the earth.

2. Instinctive rule

In many ways the application of the 80:20 rule is instinctive and we know that it is right when it feels right. The important point is that when you can separate the vital few from the trivial many then you can begin to concentrate your efforts where the rewards are greatest. You can be more effective in your work when you concentrate on the vital few. It is logical that if you are going to attempt to improve something then you should start with the biggest contributors.

Take, for example, stocks in your warehouse. If you have £800 worth of stock of item A and £200 worth of stock of item B and you need to reduce inventory by 20%, i.e., £200, then where do you start? The obvious answer is that it is easier and quicker to reduce the stock value of A by £200 than to reduce the stock value of B by £200. Pareto is all about finding the 'vital few' and concentrating on these to get the best results.

The idea of having a 'key account manager' to be personally responsible for your top accounts is a reflection of Pareto, only 20% of your customers probably represent 80% of your turnover/profit/complaints and it pays to look after them and to make them feel special.

3. Logical groupings

The first step in using Pareto is to gather information on call-backs, sickness, profit per customer or whatever it is you wish to improve. The information is then grouped into logical categories. For call-back analysis the obvious initial grouping would be by installation team and for customer analysis the initial grouping would be by customer. Try to get the information into as few categories as possible

(about six is best) and if you have small numbers, i.e., lots of once off customers, then you can use a special category called 'other' for the trivial many.

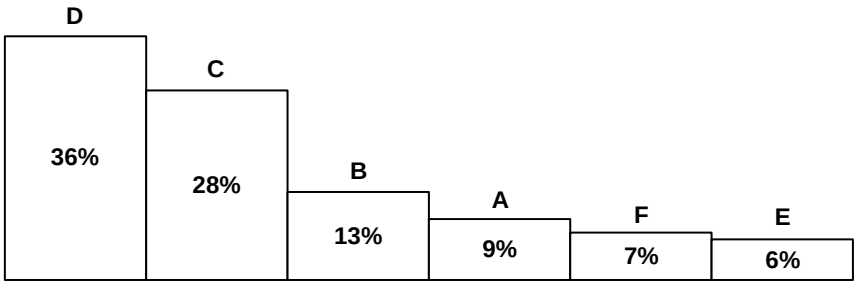
This information is then plotted as a bar chart by category (see Examples), starting with the highest and going to the lowest. If you have used a category for 'other' then this should be plotted last. The charts are then used to decide where you should take action and will also give information as to the action required.

4. Examples

Example 1: Call-backs per installation team

This example shows the use of the 80:20 method for dealing with call-backs and installation teams. The information was gathered over a 12-month period for the six teams and plotted to show the number of call-backs per installation team.

Team	Call-backs	%
A	25	9
B	36	13
C	75	28
D	98	36
E	15	6
F	20	7
Total	**269**	**100**



Responses:

Teams C and D may need training, better supervision or perhaps even more radical responses.

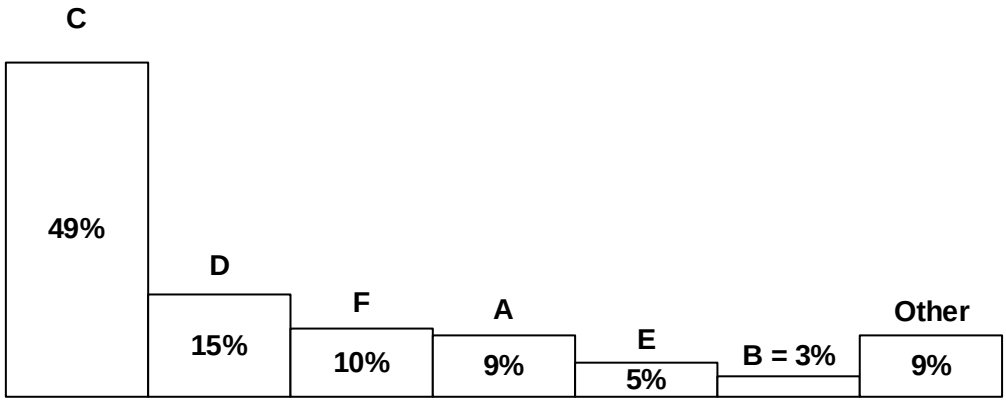
What areas are Teams C and D making mistakes in? Another chart on the reason for the call-backs may give more detailed information for training purposes. It may be that Teams C and D are fitting more of a 'problem product' that needs more care or training.

Example 2: Customer sales analysis

This example shows the use of the 80:20 method for dealing with customer analysis for sales.

Customer	Sales	%
Adams	15,000	9
Baker	5,000	3

Cold	80,000	49
Down	25,000	15
Eric	8,000	5
Fame	16,000	10
Other	15,000	9
Total	**164,000**	**100**



Responses:

Spend more time with Cold. They are 50% of your turnover but do you give them 50% of your time? Ensure good service, quick response to Cold.

Additional work

Try plotting profit per customer, the margins on Cold's work may be so small that the actual profit on Down's work may be greater. This may be an incentive to try to get more work from Down.

At nearly 50% the volume of work from Cold is a large percentage of your turnover, you may need to consider trying to reduce your dependence on this business.

You can use further charts to zero in on the areas for improvement but remember to always go for the big ones first. They're generally the easiest to improve and you can look very good very easily.

Pareto analysis is useful for taking a 'snapshot' of the information and targeting areas for improvement or concentration.

NOTE: Pareto analysis does not stop you making instant improvements. If one of the 'trivial many' causes is easily fixed now then it should be done now. You should never use Pareto as an excuse for not doing something. It is also important that you think about the information that you are gathering. Make sure that you have all the information before making your decision. Try not to get all your exercise by jumping to conclusions!

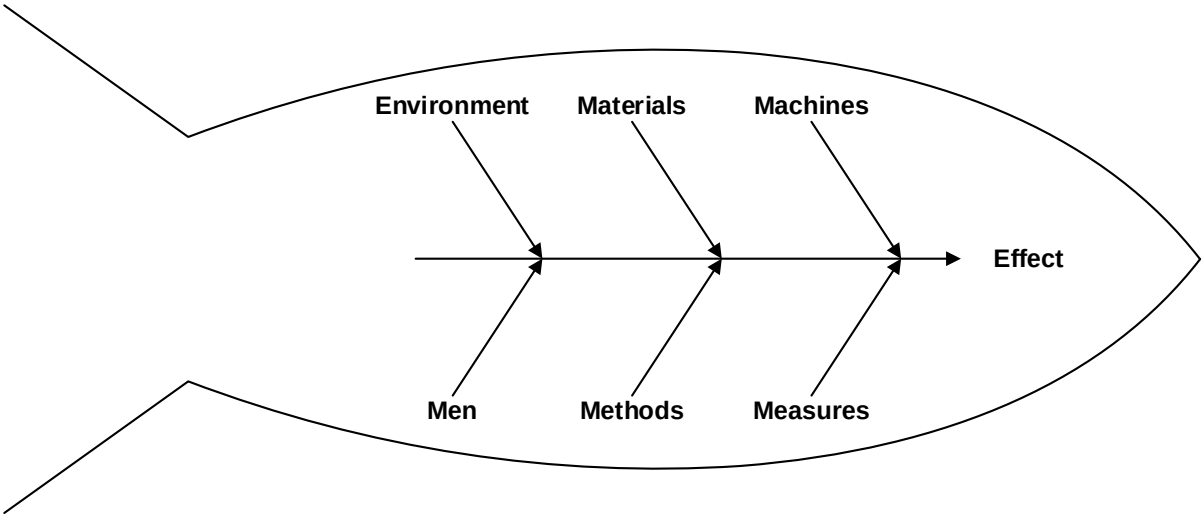
Part 3: Charting the progress

1. Cause and Effect Charts

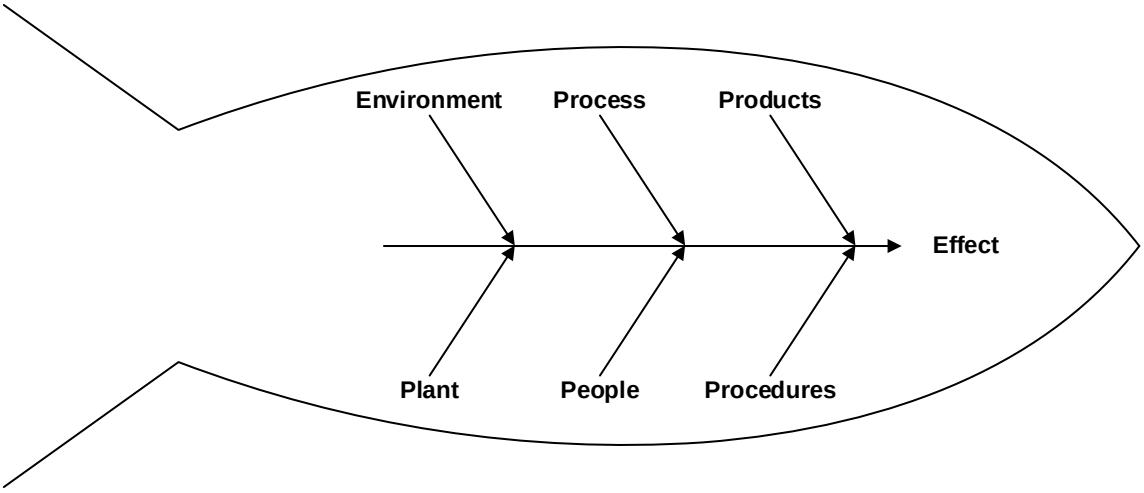
Cause and Effect charts are also known as Fish-bone Diagrams or Ishikawa Diagrams and are used to note ideas of theories for problem solving in production or other processes. The 'fish head' is the effect that needs to be increased (or decreased), the large bones indicate major categories or potential causes and the small bones are the minor categories. In many ways the cause and effect chart resembles a mind map (Mind Maps – see Tool No. 8) but it is more specific in application.

To start and gain confidence, the framework can be initially based on the M's or the P's:

Example 1: M's – Material, Machines, Men, Methods, Measures and Environment

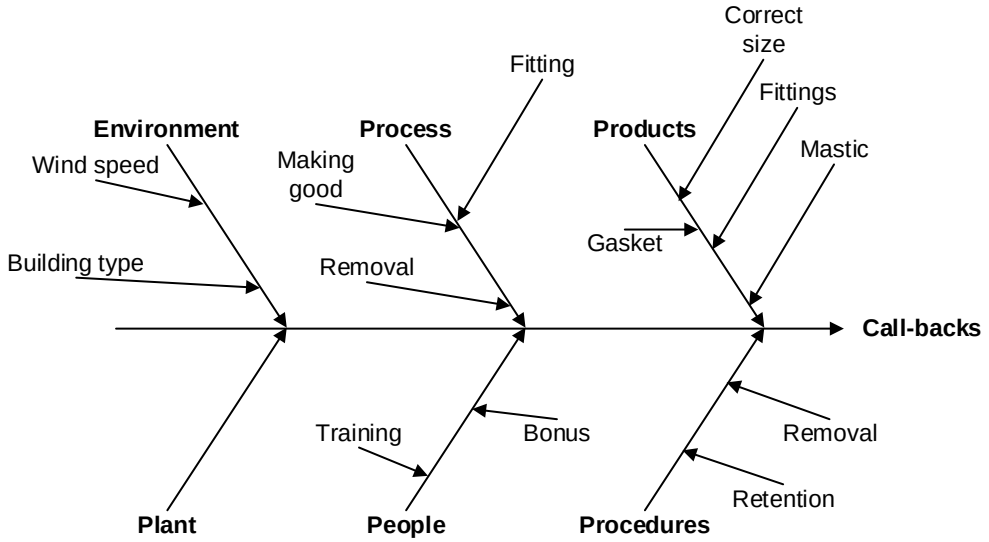


Example 2: P's – Process, Product, Plant, People, Procedures and Environment



It can be useful to group ideas into logical branches and it is also recommended that ideas are given a ranking of importance (say one to 10). In doing this it is essential that the people making the chart, and doing the ranking, know what really happens in their process and are not influenced by what should happen in the ideal world (see Figure 3).

Example 3: Causes of Installation Problems



2. Taking action

As the diagram of theories is developed and studied, proposals should be put forward for testing the theories. Ways of doing this are:

- Analysis of past data (Pareto Principle – see Tool No.2).
- Studies of current production (Scatter diagrams – see Tool No. 4).
- Experimentation.

I have personally used this method, working with four line operators to identify and make a simple process modification that cost £450 and saved £450 per week every week and is still saving £450 per week. The operators knew their process and the ways to make it better but no-one had thought to ask them.

Part 4: Scattering the problem

1. Scatter Charts

The Cause and Effect chart was introduced as a method of finding out what causes could possibly influence an effect you see. The chart is really a list of possibilities and you will naturally want to check if the cause in the chart really does influence the effect. In other words: are the cause and effect related?

This is the step that many people leave out, they sometimes list the causes but then they get their exercise for the week by jumping to conclusions and assuming that the first cause they identify is the main one.

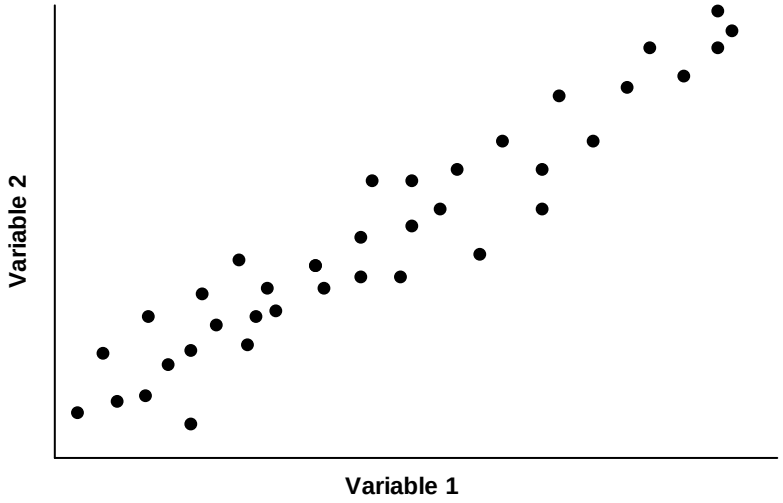
Just because Event A comes before Event B it is not necessarily true that Event A must cause Event B.

In the Western world we have become very hooked on the idea of causality. If I change the oil in my car and one week later the engine seizes up then it must he the oil that caused it! The fact that the car is 25 years old and was on its last legs anyway has nothing to do with it. This is also true of places like the USA where everything has got to be somebody's fault so you can first blame them, and then sue them for it. The idea of accidents and coincidences seems to have lost favour in the West. Event A does not necessarily cause Event B and they may be totally unrelated.

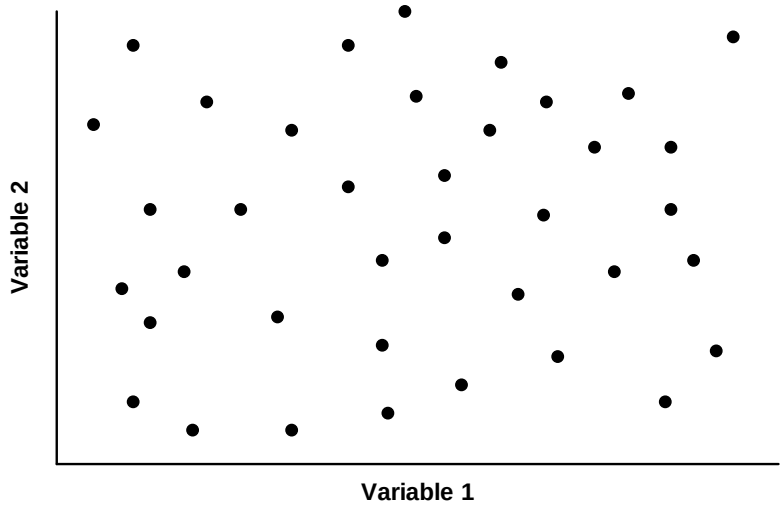
The scatter chart is a quick and dirty test for possible cause and effect relationships. It does not prove that one variable causes the other but it does make it clear whether a relationship exists and the degree of scatter gives a good idea of the strength of the relationship.

Power cuts cause babies!

For instance, it has been shown that where there is a power cut in a major city then nine months later there is a rise in the birth rate. This is not to say that the babies are caused by power cuts and that you must keep your wife indoors during a power cut, in fact..., but that is another story. There is a probably a weak relationship between power cuts and the birth rate that would be revealed by a scatter chart. Two examples of scatter charts are shown. In the first the two variables are probably related and in the second the two variables are probably independent.



Scatter chart showing a GOOD relationship between two variables



Scatter chart showing a POOR relationship between two variables

2. Essential tips

To get the best out of scatter charts you should note the following points:

- If the variables are related but the spread or scatter is very wide then the relationship may not be direct. There is probably another factor that you have not thought of that is varying and affecting the result but you are not measuring or controlling it. Finding this other factor (usually by cause and effect charts) is generally important in reducing the variation and scatter.
- The line does not need to be straight; it can be curved as well. After all you are normally only interested in increasing or decreasing one of the variables.
- Get as many points on the diagram as possible. The more the merrier is the rule for scatter charts.
- You can do sophisticated regression analysis to calculate correlation coefficients and statistical significance using a computer but in practice it is simply necessary to establish that there is a relationship. Don't go near a computer until you have tried the figures out on some graph paper!

Scatter charts are useful to find if a relationship exists and to allow you to solve a problem in the quickest and easiest way. They are a natural extension to cause and effect charts and should be used to get the best result.

Part 5: Go with the flow

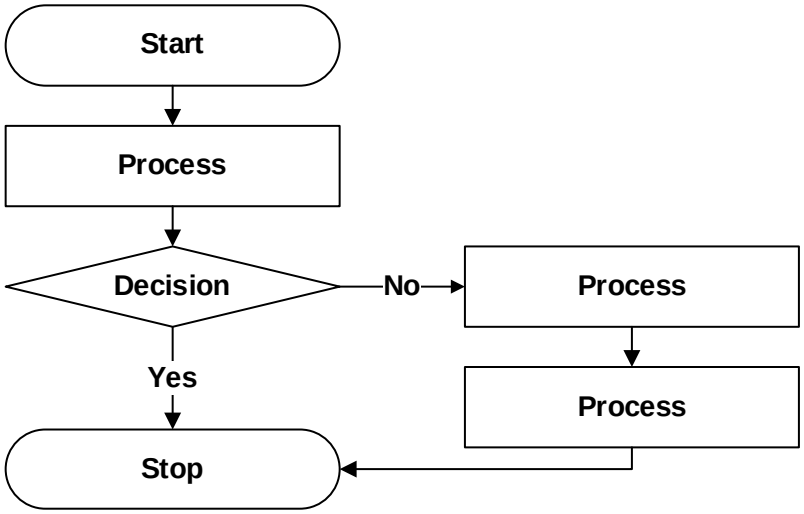
1. Flow Charts

By visually interpreting a procedure in a flow chart, complex processes can be made easy to understand at a glance. A flow chart is simply a diagram or a picture of a procedure that is to be carried out. It is nothing exotic or special and everybody should them at some stage in their work. The old saying that 'a picture paints a thousand words' is never truer than when you are trying to write out a procedure to be followed. This procedure may be for anything from how to process an order to how to install a window or even the more formal procedures such as those used for ISO 9000. Any process that needs to be carried out in a definite order should be capable of being described and simplified by the use of flow charts.

Flow charts enable everybody to see how the process works. Temporary or new staff can be trained to do things your way rather than how they feel like it at the time. Training time is reduced, errors are reduced, everybody knows what is happening and your life improves.

A flow chart is used to break a process down into the simple component steps and to give an exact picture of the process. Flow charts are used extensively in computer programming to decide the logical way for building up a computer programme for small blocks of code.

This idea may seem simple but it is often difficult because all the process steps have to be evaluated and every response given in terms of 'yes' or 'no' answers. If it is difficult for you to draw the flow chart when you understand the system then consider how difficult it is for your employees to understand how it all works. If you have difficulty drawing a flow chart at any point then it is at this very point that your employees will have difficulty in knowing exactly what to do, they will make up their own minds, be inconsistent and costly mistakes will occur. The black and white decisions are easy to describe on a flow chart but the grey areas that are difficult to chart are the ones that you need to concentrate on for systems changes, staff training or even new systems and controls.



A Sample Flow Chart

If a procedure cannot be described in terms of a flow chart then the procedure will not work.

The basic principle is to draw a flow chart of the actual process (with the operators or users) and then to draw a flow chart of the steps that the process should follow if everything worked right. The two charts can then be compared to find out where they are different. This is usually the source of a problem.

A flow chart will highlight the need for clear, unambiguous procedures (also necessary for quality control) that fully define everybody's responsibilities. Difficulties may be encountered because the process is not understood, there have been changes to the process which have not been recorded or because there really is no common process, i.e., everybody does it a different way. The discipline of drawing a flow chart can solve all of these problems.

Flow charts often make very complex written procedures easy to understand at a glance. The logic and clarity of flow charts make them appropriate for many operations. Rather than write a long and detailed procedure first, why not try making a flow chart and put it on the wall. You will be amused at the clarity of decision-making it produces.

The organisation chart

A special type of flow chart is the organisation diagram and these are used to show the reporting relationship in the company. You may say that you are too small to have a formal organisation chart but if you ever get left off the circulation list for a vital piece of information or have difficulty figuring out who is responsible for something then you probably need one.

Part 6: Plotting for success

1. Histograms

Histograms can structure data to make it easier to understand and act upon. Whenever we produce something and measure it, be it in manufacturing or in any other process, the value that is measured will vary over time. One problem we all have is that we make many such measurements and then have a problem with the amount of information that we have. There is an obvious need to structure the information and there is a need for techniques to make the amount of information more manageable. These techniques are known as 'data reduction methods' and histograms are one method for structuring data to make it easier to understand and act upon.

Consider the following measurements:

20.1	20.0	19.7	19.4	19.5
19.9	19.3	19.8	19.3	19.4
19.5	19.5	19.6	19.7	19.1
20.2	19.6	19.7	19.0	19.6
19.4	19.2	20.0	19.9	19.8
19.9	19.4	20.1	19.7	19.5
19.6	19.6	20.0	19.8	19.7
20.0	19.9	19.5	19.4	19.9
19.8	19.5			

This data does not tell us a lot and we tend to concentrate on individual numbers and fail to see an overall pattern. Instead of data we want information!

2. Tallying information

Histograms are very simple to create and give a quick picture of the information. For the information given above the easiest way to reduce the information would be to use a 'tally sheet' where individual measurements are marked as they are recorded:

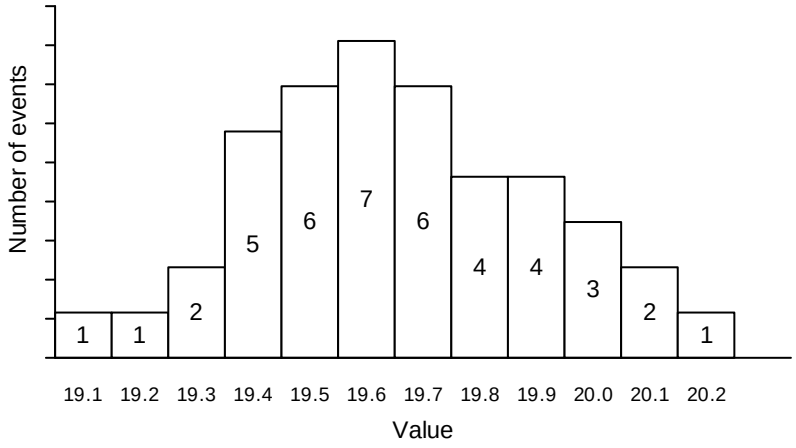
Measurement	Frequency	%
19.1	1	2.4
19.2	1	2.4
19.3	2	4.8
19.4	5	11.9
19.5	6	14.3
19.6	7	16.7
19.7	6	14.3

19.8	4	9.5
19.9	4	9.5
20.0	3	7.1
20.1	2	4.8
20.2	1	2.4

Note: When using a tally sheet, it is best to use 'five bar gates' to make recording and later counting easier.

3. Plotting a histogram

The real benefit comes when you plot the histogram. The seemingly 'random' data given above can be converted by the tally sheet into a histogram. Which one gives you the most information?



A Typical Histogram Layout

When the tally sheet is complete, this information can then be plotted as a histogram to help show the big picture clearly and simple. By using a histogram, it is easy to see the highest and lowest values, the centre of the distribution, and the chart can give us a 'quick' picture. The interval of the measurements is referred to as the cell size and for the example above the size of the 'cell' was easily seen. In some cases, this is more difficult to see and the rules for cell size are as follows:

- The cell size can be the same as the unit of measurement but must never be less than this. The unit of measurement is often the best guide to the number of cells, provided the scatter of the results is not too great.
- When the unit of measurement is not used then a rough guide for the best number of cells is given by the following rules:

Number of Measurements	Number of Cells
< 50	5 to 7
50 to 100	6 to 10
100 250	7 to 12
> 250	10 to 20

- After the number of cells has been decided an initial estimate of the cell size can be given by the formula:

$$\text{Cell Size} = \frac{\text{Highest Measurement - Lowest Measurement}}{\text{Number of cells}}$$

This cell size is then rounded up or down to give a convenient number to plot and use.

Histograms give much more information than either simple measurements or averages. Averages tell you nothing about the best and worst cases or the spread of the results.

4. Situations where histograms can be useful:

- To record elapsed time from receipt of order to delivery.
- To determine number of days credit actually given.
- To record results of manufacturing trials etc.

Histograms help to provide the user with a great deal of information, are easily communicated and inexpensively displayed.

General Topics – The Manager's Toolkit

Part 7: Studying capability

1. Capability studies

Capability studies can analyse if a production process is capable of producing parts to the tolerance required.

The Histogram (Histograms – see Toolkit No.6) can be extended into a Capability Study for the process. This is a method for seeing if a production process is capable of producing parts to the tolerance required.

If enough samples are taken and if the cell size is decreased then the histogram begins to look like Figure 1.

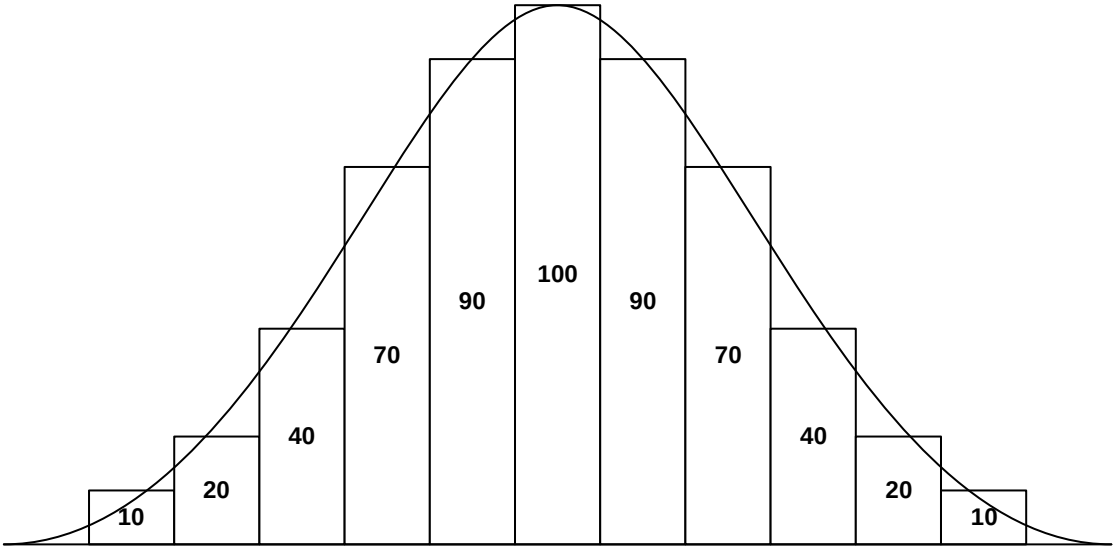


Figure 1: The Normal Distribution

This is known as the 'normal distribution' or bell-curve. This normal distribution describes how many things vary, it shows how height varies in the population, how intelligence varies in the population, and how a process produces parts. The graph shows the number of people or parts with a given intelligence or size.

We know that it is physically impossible to produce every successive part from a process to exactly the same dimensions. If enough measurements are taken then the normal curve will begin to appear. The greatest number of parts is near the centre of the curve with small numbers of parts being produced over the edges.

This normal distribution is predictable and can be fully described by just two numbers:

- Mean – This is the average of all the individual values. It is the centre of the distribution and gives the 'where' value. It is written as X.
- Standard Deviation (σ) – This is the 'spread' of the values and is related to the variability of the process. It is calculated by a simple formula, (it is even marked on many calculators) and is written as s.

The standard deviation is such that the limits X +/-σ contains 68% of the samples, the limits X +/- 2σ contains 95.44% of the samples and +/- 3σ contains 99.73% of all the samples.

If the average is 10 and the standard deviation is 1, then 68% of the samples will have a value in the range of 10 +/-1 (between 9 and 11), 95.44% of the samples will have a value in the range of 10 +/-2 (between 8 and 12) and 99.73% of the samples will have a value in the range of 10 +/-3 (between 7 and 13).

The value +/-3σ or 6σ is a special value and is termed the 'process spread' or process variability. The spread can be described by Cp where:

$$Cp = \frac{\text{Specified Tolerance}}{6\sigma}$$

If Cp is < 1.33 then the process is not regarded as being capable of reliably producing in-tolerance parts.

The location can also be described by Cpk where Cpk is the smaller of:

$$Cpk_{Upper} = \frac{\text{Upper Tolerance Limit - Mean}}{3\sigma}$$

or

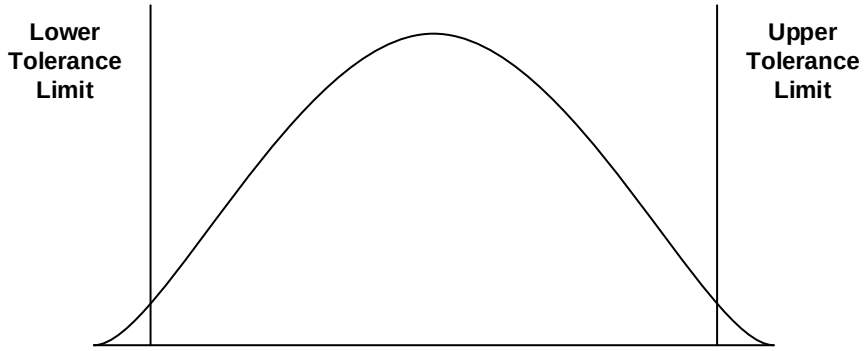
$$Cpk_{Lower} = \frac{\text{Mean - Lower Tolerance Limit}}{3\sigma}$$

If Cpk is < 1.33 then the process is not regarded as being capable of reliably producing in-tolerance parts.

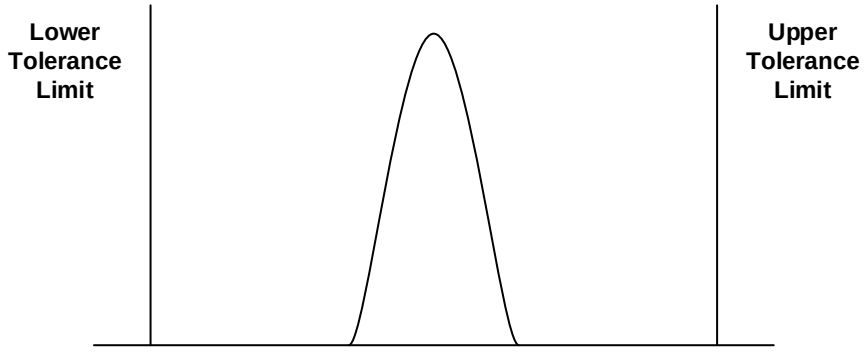
2. Ease of information

A capability study can give valuable information about a process quickly and easily as shown in the examples:

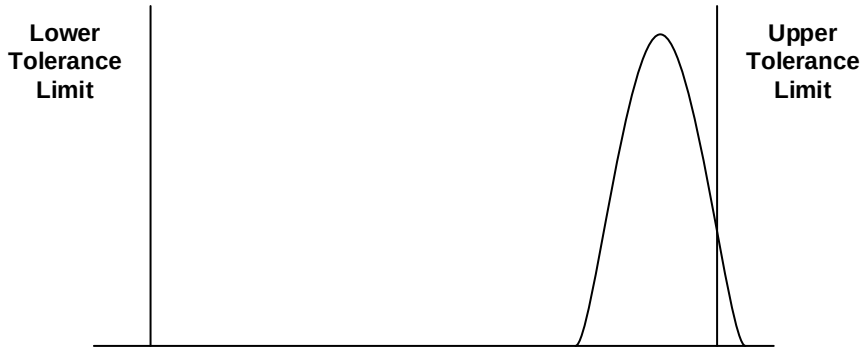
Example 1



The process variability is greater than the specified tolerance. Out of tolerance parts will always be produced. The process is not capable.



The process variability is much less than the specified tolerances. It is easy to produce in tolerance parts provided the average is kept near the nominal.



The process spread is much less then the specified tolerances but out of tolerance parts are being produced. The machine needs adjustment.

3. Using the information

Capability studies are vital in the purchasing machines and in setting realistic and achievable tolerances.

If a supplier tells you that a saw will cut to +/- 0.1mm then ask what the Cp and Cpk values are. If he doesn't understand then cut 50 pieces, measure the lengths, calculate the mean and standard deviation (from your calculator) and then work out Cp and Cpk based on +/- 0.1 mm. If they are not greater than 1.33 then the machine will not cut to +/- 0.1 mm.

Capability studies will tell you if a machine is operating properly and if you can ever expect to get good results from it. Capability studies lead on naturally to Statistical Process Control but that is a longer story.

Part 8: Mapping the Mind

1. Mind Maps

Most people are faced at some stage with the need to prepare a report, lecture, letter or other pieces of writing. A common response is: "I don't know where to start". The idea of a Mind Map is to help you to start very easily and to plan what you are going to write in a simple way.

Most of our difficulties come because we have been taught to organise our thoughts in a list fashion. We write down the title, then the first idea, then the second and so on. This linear manner goes from A to B to C and then to D. When we try to plan what we are going to write we start at A and try to work through to D.

The trouble with this method is that our brain simply doesn't work this way. We think about D before we've finished writing about B. We remember something about A after we've started writing about B and there is no space to fit it in. Our minds leap about, we lose our way and the real difficulties begin.

Mind maps are designed to get over this problem and to accept the fact that our brains work on linked concepts rather than in a linear fashion.

2. Starting off

Creating a mind map is simple:

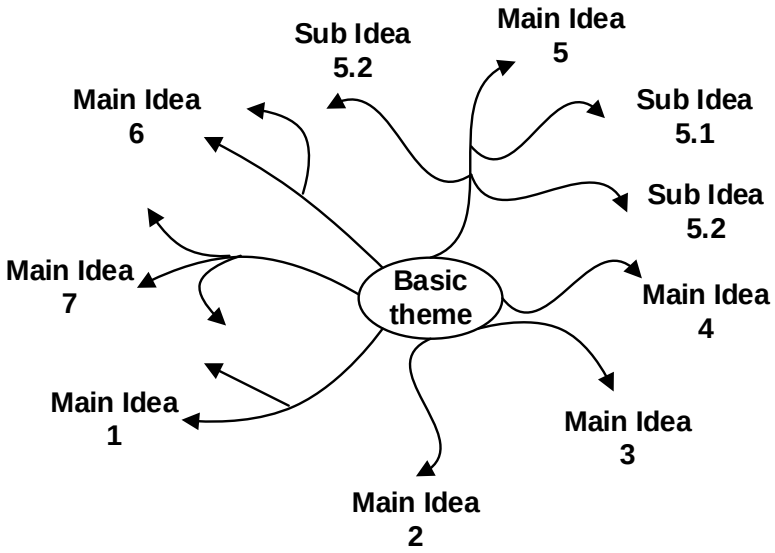
Get a clean sheet of paper (preferably A3) and draw a shape in the centre.

Write the central idea or topic in this shape (it may be useful if the shape is related to the central idea).

- Draw lines out from the central branch to represent the basic / main points.
- Label each main branch with one or two words to give the main point.
- Draw minor lines from the main lines to note other points. Label these lines.
- Connect related points, regroup the ideas and finalise the map.

Whilst creating the map it is best if you do not attempt to develop any idea completely. Simply note the key words or concepts as they occur and slot them into a relevant branch or create a new one. Do not hesitate over where they go, simply put them down where they come to you.

After you have completed the major lines and a lot of minor lines you will find that links develop. You can move ideas around once they are on paper but the difficult bit is to get them there first.



A Sample Mind Map

3. Hints

- Try using colours to highlight groups of concepts
- Develop and use personal codes
- Print in block capitals

Having created a mind map you will often want to then prepare your letter / report etc. This is the easiest part. All the information is already on your mind map and you have an instant global view. Go through the map marking off the sections (using colours) and numbering them in the order you want to consider them. You can then prepare your list-based outline if you want but this is rarely necessary.

Try using mind maps at meetings to record ideas – see how we wander from the central point.

Try using mind maps for brainstorming either by yourself or in a group.

The best books on this are: 'Use Your Head' by Tony Buzan and 'The Brain Book' by Peter Russell.