Unit 12 – Quality management

Unit 12 - Learning Objectives

To gain an understanding of:

- Project quality management
- The difference between quality planning, quality assurance the quality control and continuous improvement.
- The benefits of project quality management.

Quality Management

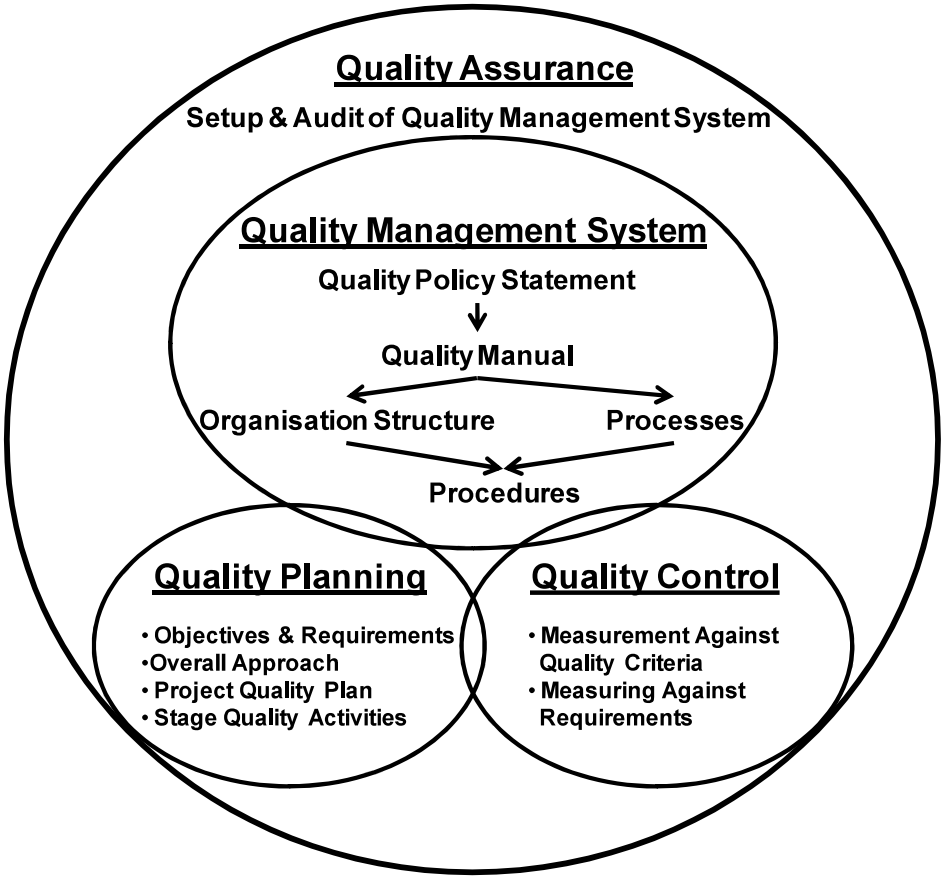
Quality management is the process of ensuring that the quality expected by the customer is achieved. How quality is going to be achieved needs to be planned and documented.

There are a number of elements involved which inter-relate as follows:

- A **Quality System** is normally utilised to implement quality management. This will have processes, procedures and an organisation structure. Both client and supplier may have quality systems, the project would have to decide which one to use, or perhaps a mixture of them both. Adopting a project management methodology typically is part of a corporate quality management system.
- **Quality Assurance** ensures the quality system is being operated and is effective in achieving an end product, which meets quality, customer and stakeholder requirements. The role of quality assurance should be separate from the project team, and in some cases it may be independent of the organisation to monitor the use of the quality system across the organisation.
- **Quality Planning** will establish the objectives and requirements for quality, detailing the necessary activities for the application of the quality system. In the Project Plan document, quality requirements and expectations are recorded before the project is undertaken, as well as the quality method to be undertaken. This will remove uncertainty and allow quality to be achieved in a visible and understood manner. The delivery of the projects products and services may be broken down into a number of manageable work packages. When this happens, the quality requirements of each should be detailed in a stage plan. Upon completion of each package/phase, the customer checks whether the product is fit for purpose, whether it matches the quality criteria and signs off accordingly.
- **Quality Control** ensures the products meet the quality criteria specified. Products are examined to determine if they meet requirements. These can be done in formal quality reviews.

Benefits of Quality Management

- Provides opportunities for continual improvement.
- Improves product quality and repeatability.
- Increases process efficiencies.
- Reduces failure costs.
- Increases employee satisfaction.
- Reduces staff turnover.
- Provides confirmation of detailed customer requirements.



Cost of Quality Management

The cost of quality refers to the total cost of all efforts related to quality. Project decisions can impact on operational costs, on quality as a result of product returns, warranty claims and recall campaigns. However the temporary nature of the project means that investments in product quality improvement, especially defect prevention and appraisal, can often be borne by the acquiring organisation rather than the project, since the project may not last long enough to reap the rewards.

Quality costs are also the total costs incurred in investment in preventing non-conformance to requirements, appraising the product or service for conformance to requirements and failing to meet requirements (rework). Failure costs are often categorised into internal and external. Failure costs are also called cost of poor quality.

Failure costs typically comprise:

- Costs of correcting defects, before and after delivery.
- Cost of overruns against time and budget.
- Unnecessarily high maintenance costs.
- Indirect costs associated with a frustrated work force.
- Indirect costs that users incur due to poor quality products (e.g. loss of business due to poor reputation).

CONTINUOUS IMPROVEMENT

There are 2 main processes employed to continuously improve.

Problem solving - is used whenever there is a known problem (therefore reactive), which we have to define and then provide a solution. Problem solving is focused on specific non-conformences or improvement projects. Problem solving is supported by a number of problem solving tools which are discussed at the end of this section.

Process Improvement - is used as the name suggests, to improve processes. There may not be a perceived problem but the process in itself may be inefficient, incur duplication of effort etc. For improving processes we use flow charting techniques.

Both processes take advantage of being systematic in that they:

- Are thorough.
- Provide evidence to show how the problem was solved or process improved.
- Help avoid the rush to jump-to-a-solution without knowing the real causes.
- Enable possible solutions to be tested.
- Help with complex or undefined problems.

Why improve processes and solve problems?

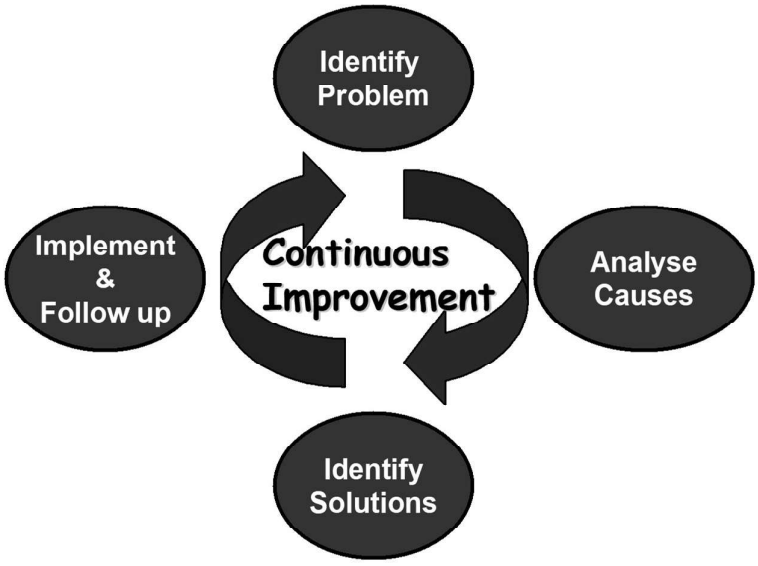
Using teamwork, successful techniques and good data we can improve the quality of our processes and services and therefore improve the quality of delivery to the customer.

Problem solving

The complexity of businesses using processes, people, equipment, resources and suppliers, means that there will always be problems to solve and processes to be improved. The four-stage process is a sequence of logical steps, which focus problem solving on the identification of the root causes of the problem.

The four stages are as follows:

4 Stages of Problem Solving



Improvement requires two skills:

Problem analysis – where a non-conformance is identified and an analysis conducted to identify the root cause.

Implementation of changes – where a plan must be put in place to ensure that the identified solutions are implemented successfully.

Check sheets

Description

A Check Sheet is an easy to use, structured form that makes it easy to record and analyse data. Tally marks are made to indicate how often something occurs. Check sheets provide a clear record of gathered data in a form that permits easy analysis.

Check Sheets:

- Identify and quantify possible causes, types and locations of problems.
- Standardise data collection for a process – ensuring that everyone collects comparable data in the same format.

Principles

- keep the form simple and easy to understand.
- Include only information you intend to use.
- Make sure people interpret the categories in the same way.
- Keep separate check sheets for different days, people etc.
- Try out the form before you use it.

Instructions for use

1. Decide what data is needed.
2. Decide how the results will be analysed and used.
3. Design a Check Sheet for recording data.
4. Validate by testing it on someone not involved in its design.
5. Gather the data.

Example

Expense Report Receipts Missing					
Type	Sales	HR	Mfg	Purchasing	Total
Taxi	10			4	14
Meals	12	2		8	22
Fuel	2	6	1	1	10
Total	14	8	1	13	46

Pareto

Description, In the late 1800s, economist and avid gardener Vilfredo Pareto established that 80% of the land in Italy was owned by 20% of the population. While gardening he later observed that 20% of the peapods in his garden yielded 80% of the peas harvested.

The Pareto Principle or the 80:20 Rule has proven its validity in a number of other areas.

In the business world, it has been found that the principle could be applied to many areas, such as:

- 80% of decisions come from 20% of meeting time.
- Roughly 80% of your managerial problems and headaches are caused by just 20% of your problems.
- 80% of your measurable results and progress will come from just 20% of the items on your daily To-Do list.
- 80% of a Manager's interruptions come from the same 20% of people
- Roughly 20% of the input errors typically cause the lion's share of defects.
- Roughly 80% of customer complaints are about the same 20% of your projects, products or services.

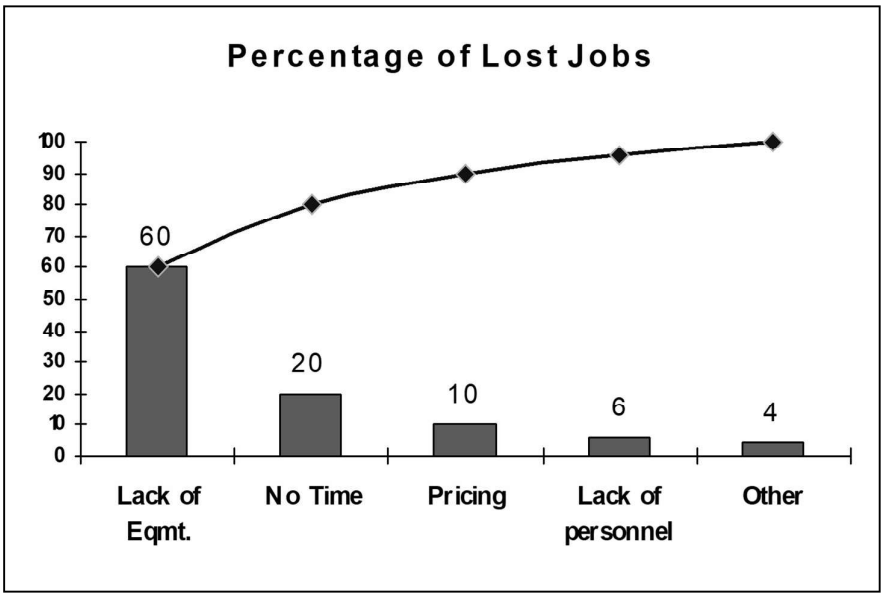
A **Pareto Chart** communicates the results of an analysis used to narrow down the sources of trouble, by ranking or prioritising data in order of importance. The Pareto principle states that “for nearly any event or consequence, of all the contributing factors, only a small number will account for the bulk of the effect”. Pareto analysis shows at a glance which problems, options or possible causes are top priority.

For problem solving, the analysis can be used during step 1- define the situation, to help narrow the scope of a problem. During step 3- identify root causes, it can also be used to rank problems and look closer at non-conformance data.

Principles

Instructions for use

1. Classify the group data based on shared characteristics such as non-conformance, downtime, customer complaints.
2. Organise the data in order of magnitude on the vertical axis.
3. Arrange the groups along the horizontal axis. Begin at the extreme left with the one costing the most or occurring most frequently. Proceed in descending order.
4. Draw the bars to the values on the vertical axis.
5. Draw a cumulative curve or line graph across the top of the bars. This represents the cumulative total for each item and plots the curve of the Pareto Chart. End the curve at 100 percent in the upper right hand corner.
6. Interpret the results. Compare the height of the bars to evaluate the relative importance of the problems.



The above diagram is an example of a Pareto analysis chart.

Control Charts

The **Control Chart** also known as a **Shewhart** chart (after its inventor Walter A Shewhart) or a **Process Behaviour Chart** is a graph used to study how a process changes over time. Data are plotted in time order, with a central line for the average, an upper line for the upper control limit and a lower line for the lower control limit. These lines are determined by historical data, by comparing current data to these lines you can draw conclusions about whether the process variance is consistent (in control) or unpredictable (out of control), affected by special causes or variations.

Control charts used for variable data are employed in pairs.

The top chart monitors the average, or the centring of the distribution of data from the process.

The bottom chart monitors the range, or the width of the distribution.

E.g. If you were at a shooting range, the average is where the shots are clustered on the target; the range is how tightly they are grouped.

The control charts used for attribute data are used singly.

When should we use a control chart?

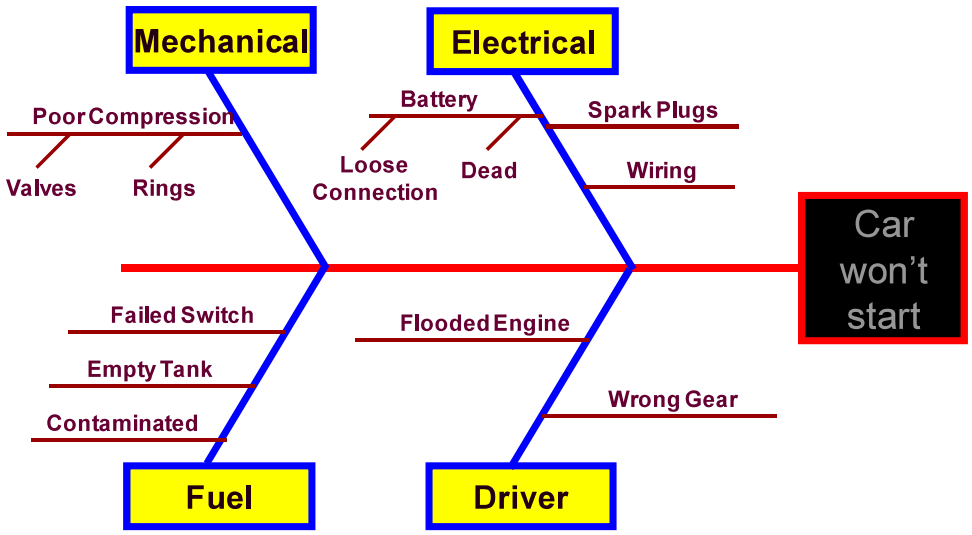
- When controlling ongoing processes, by finding and correcting problems as they occur.
- When predicting the expected range of outcomes from a process.
- When determining whether a process is stable (in statistical control).
- When analysing patterns of process variation from special causes (non-routine events) or common causes (built into the process).
- When determining whether your quality improvement project should aim to prevent specific problems or to make fundamental changes to the process.

Basic procedures for using a control chart

- Choose the appropriate control chart for your data.
- Determine the appropriate time period for collecting and plotting data.
- Collect data, construct your chart and analyse the data.
- Look for “out-of-control signals” on the control chart. When one is identified, mark it on the chart and investigate the cause. Document how you investigated, the learning outcome, the cause and how it was corrected.

Cause and Effect (Fishbone/Ishikawa)

The Cause and Effect diagram is a powerful technique used to graphically depict and organise possible causes or risks of a situation. This technique combines analytical and creative thought with team effort and provides a way to break down problems into smaller pieces, which are easier to manage and understand.



Learning Objectives

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