

## “THE SEVEN BASIC QUALITY TOOLS” SEMINAR

**By Ms. Stephanie Singh** . On Tuesday 24<sup>th</sup> May 2016, Mr. Kester Gabriel ASQ Country Counselor, Trinidad and Tobago presented on “The Seven Basic Quality Tools” at a seminar held at the SBCS Campus, Trincity, in Trinidad. His Continuous Process Improvement execution has spanned several economic sectors including Food and Beverage Manufacturing and Telecommunications.

As Country Counselor, Mr. Gabriel plays a vital role in establishing an ASQ relationship with members, and promoting communications and networking opportunities. The seminar was the ideal opportunity for him to raise awareness of ASQ and the wealth of knowledge (ASQ website, Knowledge Center and ASQ TV) available to members while allowing for an interactive session with professional sharing (industry examples from the presenter and participants).

There are many names for these seven basic tools of quality, first emphasized by Kaoru Ishikawa, a professor of engineering at Tokyo University and the father of “quality circles.” Mr. Gabriel referred to these seven tools as the “Magnificent Seven”. His presentation explored troubleshooting with these quality tools which transforms information into solutions. The Magnificent Seven are: Flow Chart, Cause-and-Effect Diagram, Check sheet, Scatter Diagram, Histogram, Pareto Chart and Control Chart. These were presented in the order listed below which may be one logical way of effectively finding solutions in any organisation. Templates for each tool can be freely downloaded from the ASQ website (<http://asq.org/index.aspx>). These served as an effective visual during the presentation.

- **Flow Chart** - the starting point for process improvement and mapping processes. This is the ideal tool for charting how different systems connect and for enabling effective troubleshooting. One example may be the use of flowcharts to understand product flow control in a manufacturing process for the purpose of troubleshooting.
- **Cause-and-Effect (Fishbone) Diagram** – this is used when brainstorming the major categories of causes of a given problem statement. Generic headings used include Methods, Machines (equipment), People (man power), and Materials, Measurement

and Environment. This tool allows for flexibility and headings can be adapted to fit any organisation/problem. A helpful tip includes asking “Why does this happen?” for each cause. Repeatedly asking “Why?” to the solution provided often generates deeper levels of causes. For example, a high rejection rate on the discharge of a carbonated beverage filling machine maybe the result of an obstructed photosensor, a sensor that requires recalibration, faulty filling valve or warmer than usual filling liquid which in turn causes excess foaming and a bad reading.

- **Check Sheet** - Interestingly, Mr. Gabriel mentioned that the Check Sheet is often overlooked even though it is a powerful concept with cost benefits. The document is used to collect data in real time at the location where the data is generated. The checksheet should be created by persons with significant experience in that particular asset or process and this should also be reviewed and updated regularly to capture any new changes. Persons who use this tool should also have some knowledge of the process and plant so that the sheet is applied appropriately. Qualitative and Quantitative data may be captured by this sheet and it can be adapted for a wide variety of purposes.

Similarly, a **Checklist** is also important for ensuring consistency and completeness in carrying out a task. Many of us use the “to-do list” in this same way.

- A member of the audience made a contribution that it is important for a “Comments” section to be included on checklists to allow for feedback on problems to be corrected.
  - A checklist can be helpful in a glass bottling plant. It can be helpful to use a checklist to ensure that printing and coding are accurate and not missing or bad. A good print is necessary to allow for tracing if issues arise.
- **Scatter Diagram** - Correlation chart type of plot using Cartesian coordinates. Ideal for paired numerical data and when the dependent variable may have multiple values for each value of the independent variable. Mr. Gabriel informed participants that this tool is highly useful and flexible for experiments and testing e.g. antibiotics and cultures against diseases. Stratification can also be easily identified on a scatter diagram and is

used when comparing results from identical cultures or efficiencies of different production lines.

- **Histogram** - Frequency column graphs used when data type is numerical and when you want to see the shape of the data's distribution. Mr. Gabriel highlighted three histogram shapes: positive skewed data (skewed-right distribution), negative skewed data (skewed-left distribution) and bimodal data distribution. An example of bimodal data distribution can be found in the daily provision of utility services (water, electricity or telecommunications). Solutions for bimodal capacity problems were discussed. For example, water companies may implement higher taxation during the daytime peaks to delay water consumption or telecommunication companies may offer reduced rates or free calls at night as incentives to reduce the modal peaks.
- **Pareto Chart** - Named after Vilfredo Pareto but applied in a general sense by Dr. Juran, this chart contains both successive columns of reducing height and a cumulative line graph. This tool is used for prioritising the contributing factors of a problem so that the factors with the largest impact can be minimised or eliminated first. This tool can also be used to prioritise investments. The 'vital few' causes (approximately 20%) will present the most opportunity for improvement over the 'trivial many' (approximately 80%). For example, the major factors for call failure in a particular location may be caused mainly by congestion (capacity issues, bimodal profile as mentioned earlier) or bad radiofrequency antenna position. Other minor factors for failure in that same region may be faulty equipment, poor maintenance and the weather. In this case, congestion and antenna position would be addressed first.
- **Control Chart** – These graphs are used to show the run time performance of a process. By comparing the data obtained to the position of centreline and the one, two and three sigma limits, one can determine if the process is in control or is out of control. That is to say, if the process is affected by common cause or special cause variation. This tool is ideal for manufacturing sectors. For example, eight points to one side of the centreline may indicate that a key component is worn or that the machine needs recalibration.

Throughout the presentation, Mr. Gabriel asked participants to consider how they have used quality tools and how they can be implemented in this current economic recession. Reference was made to Bloom's Taxonomy – but particular attention was made to the application/use of information from this seminar.

The seminar was well-attended and concluded by emphasizing that you cannot control what you do not measure. Participants got a general overview of the seven basic tools of quality and received insights and examples of their use in industry. The seminar was an excellent avenue for sharing knowledge, problems, and transforming information into solutions.

### **Author Biography**

Ms. Stephanie Singh is currently the Executive Assistant/Quality Management Representative of Automation Technology College, a technical/vocational institution based in Trinidad and Tobago, West Indies. She holds a B.A. Literatures in English with a Minor in Gender Studies from the University of the West Indies, St. Augustine in Trinidad. She is an ASQ Certified Manager of Quality/Organisational Excellence. She is passionate about raising the voice of quality and has a strong commitment to organizational excellence and customer focused service.