

Statistical Methods in Quality Engineering

by

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I would like to talk about Quality Improvement and in particular the use of simple statistical methods to help achieve high quality at low cost. My background is in product engineering, specifically motor cars, but what I have to say applies equally well to other products and manufactured goods. Service industries can also improve quality by using simple statistical methods.

The word QUALITY is never far from most peoples lips these days. Even the Government are now talking about it! But what do we mean by quality? I came across the following definition once

QUALITY MEANS PROVIDING GOODS THAT DON'T COME BACK, TO CUSTOMERS THAT DO

But why is Quality important, and why is quality *improvement* even more important? Well, nothing is ever perfect. It is a mistake to imagine that it is. I want to show you that the search for perfect quality is endless and that we must always be seeking ways to improve the quality of every product (and service). It may be tempting to imagine that *continuous* improvement in quality is not needed, so here are some reasons why it is;

- 1 It is cheaper to make good quality product than bad. Why? Because good quality means less re-work, less scrap, less warranty claims, less waste.
- 2 If you do not offer your customers high quality at low prices, someone else will, and you will go out of business. What is acceptable today may not be tomorrow. Within the motor industry, the Japanese have set tremendous standards of high quality at low prices. They use statistical methods to achieve this, and I will show how this can be done in this paper.
- 3 $PROFIT = PRICE - COST$ is not a mathematical equation which can be manipulated. The PRICE is set by the market. A provider of goods and services can therefore only reduce COST to improve profit and stay in business (see 2. above). When one considers that poor quality impacts on machine downtime, increased inventory, decreased capacity, decreased productivity, customer dissatisfaction, customer disloyalty, then the biggest source of cost is *not* wage bills but bad quality!
- 4 Improvement in quality is environmentally friendly - if you waste less, you use less energy per unit of good product.
- 5 Improving quality is interesting and fun. It is everyone's job. What else is there?

Okay, so what has statistics got to do with all this? You thought statistics was all about numbers? Well right. And wrong. I will try to explain.

Most of you probably own a car. Have you noticed an instrument in the dashboard called a speedometer? Usually, people look at this instrument when they see a police officer. What would happen if the speedo actually told you the wrong speed? For example, suppose it read 60mph when you were really doing

