1 The Need for Quality Control

The major goals for quality control are manifold and include a need to determine the real functional tolerances required for engineering specifications and to provide a plan for control of the quality of the results of a process related to time. This is normally achieved by statistical or control chart methods.

Additionally, it is essential to know when the set-up of the equipment is safe enough to permit a production run that should not produce defective parts beyond an acceptable limit. It is also important to obtain variations in the products arising from the inherent variability of the following factors:

1. the fabricating equipment,
2. the material,
3. the operator.

Variations must be small enough to meet product specification requirements (the combined inherent product variation is called the process capability).

It is also necessary to be able to confirm, through various sampling plans or inspection methods, that the process quality is controlled and that the inspection process is as economical, as a balance between the risks involved will permit.

Finally, a major goal must be the ability to improve the quality of performance of any process or product design, using a statistical analysis of its variability.

It is also worth remembering that, for good commercial design, a specification should be based on 'the lowest acceptable quality for the minimum practical cost'. This quality must take into account customers' reaction and safety requirements.

If all the above goals are realized, then the instigation of quality control can be claimed a success. However, a feature of paramount importance is that of economy.

Improved quality may increase the value and cost of the product (see Figure 1.1) and therefore initiating quality control in an organization must be carried out efficiently. The areas where control is required must
be highlighted and investigated. They may be identified in the following ways:

(1) customer’s complaints,
(2) large amounts of rejects,
(3) large amounts of rework,
(4) late arrivals of components and products, or late deliveries,
(5) deviation requests which may be raised; these should be made difficult to raise,
(6) analysis of inspection labour force to determine its effectiveness.

**Control considerations**

When considering control, the following questions should be asked:

(1) What is the value of likely scrap against the cost of control?
(2) What level of inspection is appropriate (sample or 100%)?
(3) What type of inspection scheme is appropriate, discrete or variable?