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Guide to the economics of quality —

Part 2: Prevention, appraisal and failure model

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Foreword

This Part of BS 6143 has been prepared under the direction of the Quality, Management and Statistics Standards Policy Committee. It is a revision of BS 6143:1981 “Guide to the determination and use of quality related costs” which is withdrawn.

This edition has been extensively revised and expanded in order to satisfy the developing requirements of both manufacturing and service industries. It is for this reason that the standard is now published in two Parts.

— *Part 1: Process cost model (to be published);*

— *Part 2: Prevention, appraisal and failure model.*

Part 1, the process cost model, sets out a method for applying quality costing to any process or service. It recognizes the importance of process measurement and process ownership. The categories of quality costs have been rationalized to the cost of conformance and the cost of non-conformance. This serves to simplify classification. The method depends on the use of process modelling and the standard gives guidelines on useful techniques. The application of the process control model is compatible within the concept of total quality management.

Part 2, the prevention, appraisal and failure model, is a revised version of the traditional method of product quality costing in manufacturing industries. Improvements have been made in the light of experience and it is recognized that successful practitioners may wish to continue with this approach. Continuation of this approach does not preclude the simultaneous development of the process cost model.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

0 Introduction

Traditionally quality performance has been reported to management in terms of rejection and defective material reports. This vital information is often difficult to analyse and interpret in terms of costs. As a result, cost saving opportunities may be overlooked. Successful business requires financial planning and control. It is advisable that quality failures be presented in financial terms.

Initially, the following two important facts should be appreciated:

- a) failures, however caused, reduce profits;
- b) preventive quality control activities and the appraisal of quality standards cost money to operate.

These costs can be regarded as quality related costs and in simple terms can be classified as follows:

- 1) prevention costs;
- 2) appraisal costs;
- 3) internal failure costs;
- 4) external failure costs.

Investment in prevention can substantially reduce internal and external failure costs. Furthermore, reductions in external complaints are important not only to reduce costs but to maintain purchaser goodwill and company morale. This is illustrated in Figure 1.

The pattern of quality cost varies from company to company and the relationships shown in Figure 1 are schematic representations of the trends to be expected in quality costs as awareness of quality and improvement activities increase.

Figure 1 illustrates how an increased awareness of the cost to the organization of quality failure leads first to an increase in appraisal of product quality. Then, as appraisal together with investigation points to features/elements where improvement can be made to product design/process/systems, more is spent on prevention. Finally as preventive action takes effect the prevention appraisal and failure proportions of the costs realign and all costs reduce.

Additional resources are usually allocated for quality related activities if it can be clearly demonstrated that by so doing profitability will be increased. Effective quality management can provide a significant contribution to profit, and evidence shows that resources deployed to identify, reduce and control failure costs gives a benefit in terms of improved quality, increased profitability and enhanced competitiveness.

However it cannot be expected that unlimited resources will be available and there should be supporting financial information to demonstrate that action to improve quality is justified and to direct attention to the most urgent (i.e. cost effective) improvements.

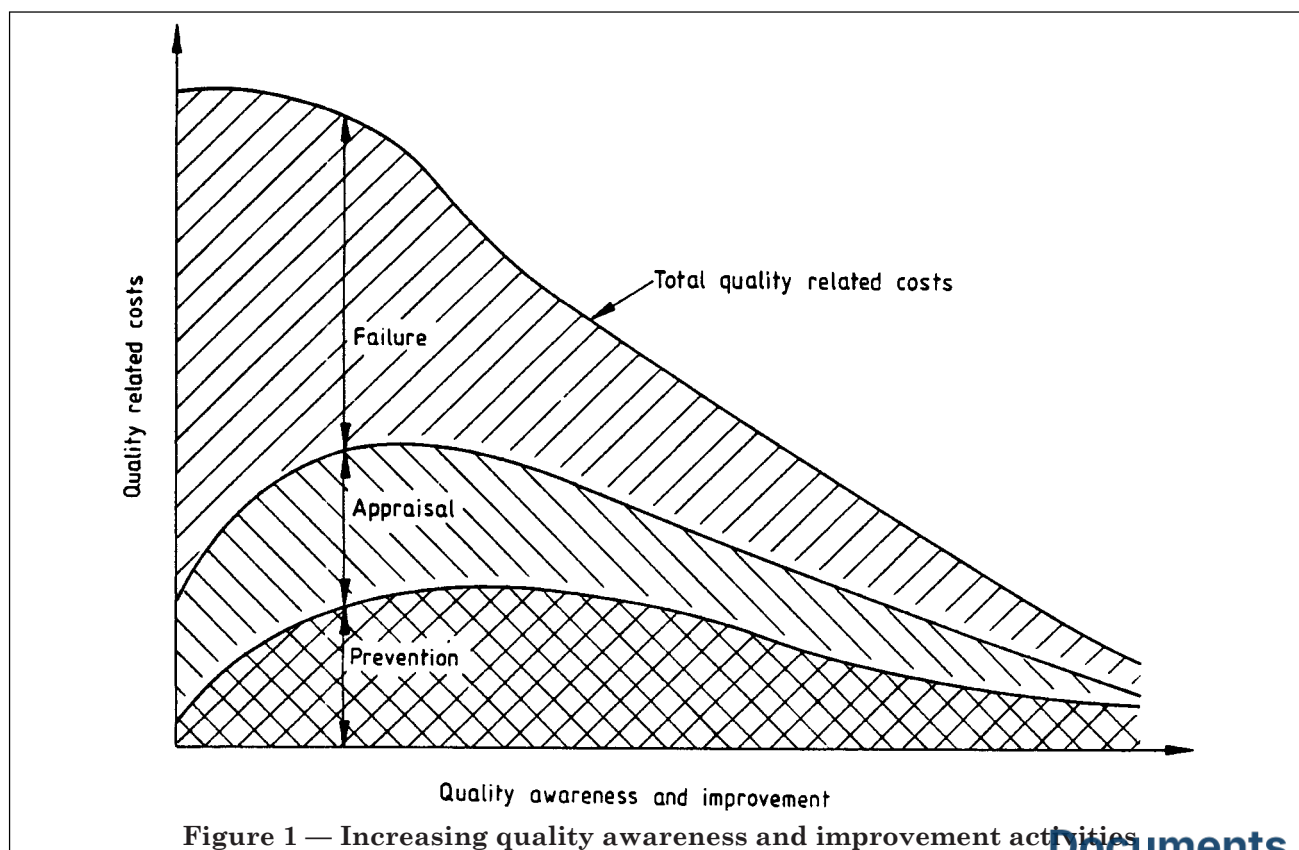


Figure 1 — Increasing quality awareness and improvement activities

Quality cost elements (see appendix A) differ from company to company and industry to industry. Management should decide which costs are to be attributed to day-by-day manufacturing control and set against production costs, and which are to be identified as quality related costs.

1 Scope

This Part of BS 6143 provides guidance on the determination of costs associated with defect prevention and appraisal activities, internal and external failures, and on the operation of quality related costs systems for effective business management.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 6143, the definitions given in BS 4778 apply, together with the following.

2.1

payroll cost

the total cost to an organization, of employing a person, including, for example, gross pay, social security cost and company pension cost

2.2

memorandum account

a financial statement, subsidiary to and not part of the actual accounts of an organization, relating to a particular activity or for a purpose not available in the actual accounts

2.3

quality related cost

cost in ensuring and assuring quality as well as loss incurred when quality is not achieved

NOTE Some frequently used subdivisions are as follows.

Prevention cost. The cost of any action taken to investigate, prevent or reduce the risk of nonconformity or defect.

Appraisal cost. The cost of evaluating the achievement of quality requirements including e.g. cost of verification and control performed at any stage of the quality loop¹⁾.

Internal failure cost. The costs arising within an organization due to nonconformities or defects at any stage of the quality loop such as costs of scrap, rework, retest, reinspection and redesign.

External failure cost. The cost arising after delivery to a customer/user due to nonconformities or defects which may include the cost of claims against warranty, replacement and consequential losses and evaluation of penalties incurred.

3 Identification of cost data

Quality related cost appropriate to the organization should be identified and monitored.

It is essential that the classification of cost data is relevant and consistent with other accounting practices within the company so that comparisons may be made between costing periods or related activities.

Quality related costs are an identifiable subset of business costs and accountants may find it useful to maintain a subsidiary ledger or memorandum account for this purpose.

For control purposes, it is necessary to allocate quality cost to an activity and the use of account codes within cost centres is one convenient method. The allocation of cost is important to the analysis and prevention of failures. This allocation should not be made solely by the accountant; advice by a technical person may be needed.

4 Quality related cost reporting

In order to have sufficient impact, the report detailing quality costs should be presented in a similar style to other management accounts, and should be supported by financial ratios and trend analysis related to the business of the organization.

The achievement of the required levels of quality involves much more than the inspection and test functions in the manufacturing stages of production. Every department of a company bears some responsibility for ensuring that the quality requirements are met (see BS 4891 for further guidance in this respect).

The collection and analysis can be used to establish the total cost to the organization and/or to the separate divisions or departments responsible for the quality related cost.

5 Operating the quality costing system

Quality related cost should be collated and reported based on data collected by the accounts department. The separate roles most likely to be established for operation of the system are as follows.

a) Accounting department:

- 1) collection of quality cost data;
- 2) allocation of quality cost to agreed activities;
- 3) provision of comparative bases for quality cost assessment;
- 4) production of an operating report for the accountancy period.

b) Quality management:

- 1) analysis of quality related cost, taking appropriate controlling action by investigating causes and making recommendations for improvement;

¹⁾ See BS 5750-0.1.