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British Standard

Quality vocabulary

Part 2. National terms

Vocabulaire de la qualité
Partie 2. Termes nationaux

Begriffe der Qualität
Teil 2. Nationale Begriffe

British Standards Institution

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Foreword

The first edition of BS 4778, which was published in 1971, contained 41 terms and definitions arranged in alphabetical order plus an appendix containing dictionary definitions of words commonly used in the quality assurance field. As was stated in the foreword it covered only a selection of general terms and thus avoided more specialized technical terminology.

The intervening years have seen a considerable growth of interest with regard to the quality of both products and services in response to market demand, consumer protection and product liability considerations. Consequently the need has been recognized for the development of a quality assurance glossary to cover in a more comprehensive manner terminology in areas such as quality management, costing and control, reliability, maintainability, decision taking, risk management, etc.

In this revised version of BS 4778, the opportunity has been taken, in the interest of European and international standardization, to adopt terms and definitions from EOQC, ISO and IEC publications where these are in general accord with established usage of the term in the United Kingdom. However, there are a number of terms for which the existing English definitions have been retained, or where definitions from a source other than EOQC, ISO and IEC have been adopted. This has been done either because they more accurately reflect the established United Kingdom usage, or because a more colloquially worded English version of a European or international definition is preferred; in some cases it is because there are no existing European or international definitions for the terms.

In compiling this glossary the committee has sought the views and comments of as broad a spectrum of opinion as possible in industry, commerce and government bodies and organizations, with the aim of producing a standard which would gain acceptance in as wide a field as possible. Total agreement will rarely, if ever, be achieved in compiling a document of this nature.

It did not prove possible to include at this stage proposals for a more extensive document. However, appendix A lists some terms related to quality assurance that can be found in other publications.

This Part contains all of the terms that were in the 1979 edition of BS 4778, but the definitions of those terms that are now in BS 4778 : Part 1 (identical with ISO 8402) have been deleted.

In the longer term it is proposed that BS 4778 will comprise three Parts as follows:

- Part 1 International terms
- Part 2 National terms
- Part 3 Reliability and maintainability terms

Work is in hand at present to prepare drafts for the complete series.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

British Standard

Quality vocabulary

Part 2. National terms

Section one. General

0. Introduction

Although it is generally acknowledged that the principles of quality assurance cross all industrial boundaries and professional disciplines, in a similar manner to financial control, there is often resistance to their general application. This may be the result of ignorance or a wish to maintain an established departmental demarcation. Much time and effort is wasted both within and between industry, commerce, government and professional and academic institutions when ambiguities arise as a result of the inability to differentiate adequately between such terms as 'grade' and 'quality level'; 'precision' and 'accuracy'; defects (in manufacturing) and 'failure(s)' (which might be the result of misuse rather than poor manufacturing or design) and similar terms which form an interface between various sectors in society. Moreover, the professional or technical use of these terms is often at variance with the meanings attributed to them by lay people. Recent or pending legislation within both the USA and the EEC relating to quality, reliability, maintainability, product liability and safety has emphasized the important interface between quality assurance, standards and the law, and the need for a more precise professional approach in the future by all the various disciplines concerned.

In accordance with the principles established in BS 4891, the prime definition of 'quality assurance' emphasizes that 'quality is everybody's business' and is not just the concern of a specialist department, if one happens to exist. In the larger organizations where specialist quality departments perform co-ordinating functions, it is important to identify the responsibilities and terms of reference of the other departments with regard to achieving the quality objectives of the organization.

NOTE. In order to make this glossary more generally applicable, proposals to include specialized 'compound terms' were not accepted. However, since quality assurance (QA) is implied within many of the definitions given (although not specifically mentioned) it is hoped that particular sectors will be able to utilize the definitions in BS 4778 as a basis for their own terminology.

1. Scope

This document presents, in an illustrated and structured form, concepts, terms and definitions designed to aid communication in quality assurance and related disciplines such as reliability and maintainability.

NOTE. It is recommended that the terms and definitions given in this standard be used in preference to product-orientated terminology currently in use in certain industrial sectors.

2. Arrangement

The glossary of terms has been arranged in conceptual form instead of alphabetically: also many of the principal interface terms are preceded by an explanation of the concept on which the definition is based.

NOTE 1. Many of the terms used in quality assurance are ordinary words which are used in a special or restricted way and therefore the dictionary definition may not be appropriate.

NOTE 2. No significance is attached to the change in type face of definitions or their sequence of numbering.

3. References

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

The following documents extend or amplify some of the aspects of quality assurance covered by this document.

- | | |
|----------|---|
| BS 600 | Application of statistical methods to industrial standardization and quality control |
| BS 1313 | Fraction-defective charts for quality control |
| BS 2564 | Control chart technique when manufacturing to a specification, with special reference to articles machined to dimensional tolerances |
| BS 2846 | Guide to statistical interpretation of data
Part 1 Routine analysis of quantitative data
Part 2 Estimation of the mean-confidence interval
Part 3 Determination of a statistical tolerance interval
Part 4 Techniques of estimation and tests relating to means and variances
Part 5 Power of tests relating to means and variances
Part 6 Comparison of two means in the case of paired observations |
| BS 4891 | A guide to quality assurance |
| BS 5179 | Guide to the operation and evaluation of quality assurance systems
Part 1 Final inspection system
Part 2 Comprehensive inspection system
Part 3 Comprehensive quality control system |
| BS 5532 | Statistics — Vocabulary and symbols |
| BS 5703* | Guide to Cusum techniques |
| BS 5750* | Specification for quality systems |
| BS 6000 | Guide to the use of BS 6001. Sampling procedures and tables for inspection by attributes |
| BS 6001 | Sampling procedures and tables for inspection by attributes |
| BS 6002 | Specification for sampling procedures and charts for inspection by variables for percent defective |

*In course of preparation.

- BS 5781* Specification for calibration systems
- PD 6112 Guide to the preparation of specifications
- DD 10 Guide to the reliability of engineering equipment and parts. Introduction
- DD 11 Guide on the reliability programme for engineering equipment and parts
- DD 12 Guide on the reliability of engineering equipment and parts
- DD 13 Guide on the assessment of reliability of engineering equipment and parts
- DD 14 Guide on the specification of reliability of engineering equipment and parts
- DD 15 Guide on the production, flow, analysis and interpretation of reliability data for engineering equipment and parts
- DD 16 Guide on the reliability of engineering equipment and parts. Practical examples of DD 10 to DD 15

Section two. Basic terms

4. Quality

4.1 Concept of quality. The word quality is often used for several distinct purposes:

- (a) '*comparative sense*' or '*degree of excellence*', whereby products may be ranked on a relative basis, sometimes referred to as 'grade' (see 15.1).
- (b) '*quantitative sense*' as used in manufacturing, product release and for technical evaluations, sometimes referred to as 'quality level' (see 23.4).
- (c) '*fitness for purpose sense*' which relates the evaluation of a product or service to its ability to satisfy a given need.

Within the context of this standard and in accordance with established usage in the quality assurance field the word 'quality' is used in the 'fitness for purpose' sense as defined in 4.1.1.

In order to improve communication and differentiate precisely between these three principal uses, it is strongly recommended that the concept of 'grade' (see 15.1) and 'quality level' (see 23.4) be utilized as appropriate to avoid confusion, ambiguity and misunderstanding.

4.1.1 quality

NOTE. This term is defined in BS 4778 : Part 1.

5. Quality assurance

5.1 Concept of quality assurance. For the purposes of this standard 'quality assurance' is defined as embracing all activities and functions concerned with the attainment of quality, rather than in the narrower sense only of the provision of proof associated with the word 'assurance'. Thus quality assurance includes the determination and assessment of quality.

If 'quality assurance' is used as the title of a department, its authority and activities should not supplant or reduce the responsibility of other departments concerning their contribution to quality. (For further guidance on organizational aspects see appendix C of BS 4891 : 1972.)

5.1.1 quality assurance

NOTE. This term is defined in BS 4778 : Part 1.

6. Specification

6.1 Concept of specification. The concept and definition of quality cover all aspects of a product, and it follows that the general specification of a product should cover all of its features and characteristics. In practice there is considerable diversity in the contents and details given in the specification of products and services, and it cannot be assumed that the specification of all products in the same general category will always contain the same elements from the quality viewpoint.

In order to clarify the position, this document proposes the recognition of twelve types of specification corresponding to the different ways in which the quality of a product or service may be approached. The definitions of these twelve types of specification are given under the following headings:

- Target specification
- Functional specification
- Product specification
- Materials specification
- Process specification
- Inspection specification
- Test specification
- Acceptance specification
- Installation specification
- Use specification
- Maintenance specification
- Disposal specification

In practice the information given under these headings may be collated and treated as a single comprehensive specification, but in the initial drafting it is recommended that they are treated separately so that each is given its full specialized attention.

This subject is of paramount importance in the achievement of quality: in many cases poor products or services are the result of inadequate, ambiguous or imprecise specifications.

6.1.1 specification

NOTE. This term is defined in BS 4778 : Part 1.

7. Product and service quality determinants

NOTE. See figures 1 and 2 for the conceptual relationships of product and service quality determinants and measures.

7.1 design. The process of task recognition and problem-solving with the object of fulfilling needs by the creation of products and services.

* In course of preparation.

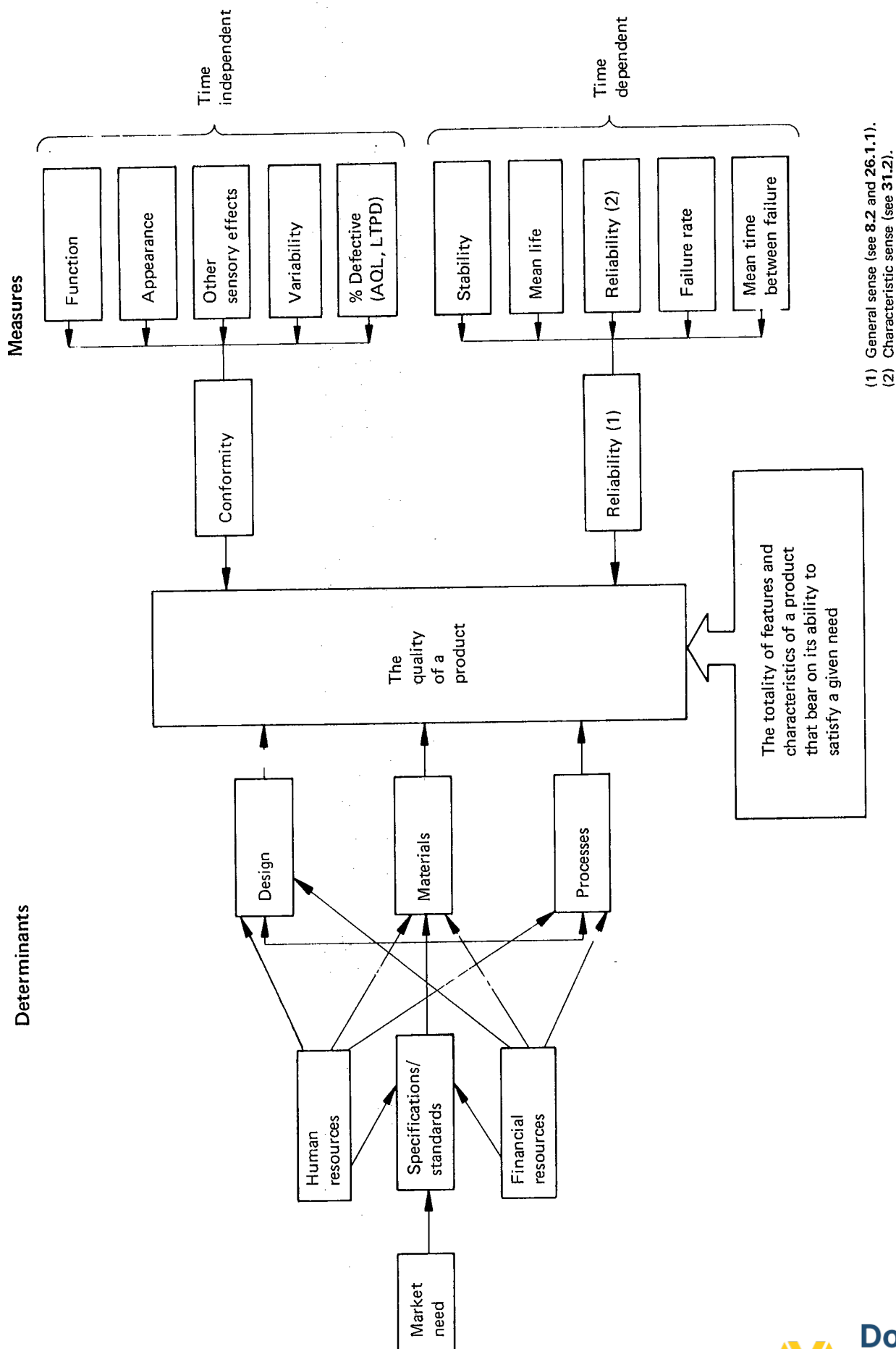


Figure 1. Some of the determinants and measures of the quality of a product

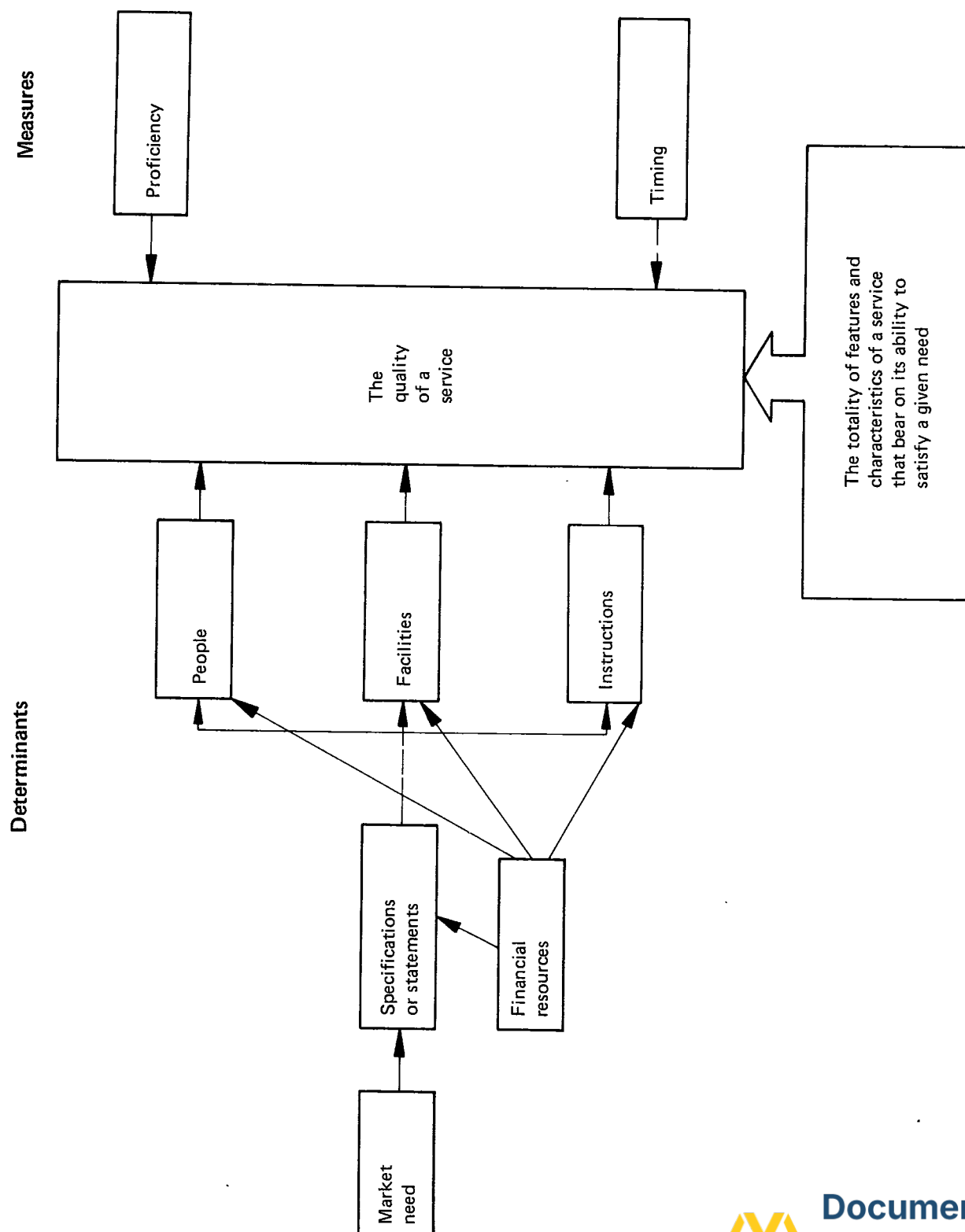


Figure 2. Some of the determinants and measures of the quality of a service

7.2 process. The method of operation in any particular stage of manufacture of the material part, component or assembly involved.

7.3 facilities. The tools, materials, supplies, instruments, equipment and other resources available for creating the product or performing the service.

7.4 instruction. The written and/or spoken direction given with regard to what is to be done, including the information given in training.

8. Product and service quality measures

NOTE. See figures 1 and 2 for the conceptual relationships of product and service quality determinants and measures.

8.1 conformity. The fulfilment of a specified requirement by a quality characteristic of an item or service, the assessment of which does not depend essentially on the passage of time.

8.2 reliability

NOTE. This term is defined in BS 4778 : Part 1.

8.3 accuracy. The closeness of an observed quantity to the defined or true value.

NOTE. Accuracy is usually expressed in terms of error or uncertainty.

8.4 precision. The closeness of agreement between the results obtained by applying defined procedure several times under prescribed conditions.

NOTE 1. Precision can relate to 'precision of statement' (e.g. 0.040 is more precise than 0.04) or 'precision of results'.

NOTE 2. Repeatability and reproducibility are measures of precision (for further information see BS 5497).

NOTE 3. The relationship between the process variability and the specification tolerance is usually termed 'relative precision' (for further information see BS 2564).

8.5 proficiency. As a measure of service quality, the degree of skill with which a performed service is carried out.

8.6 timing. The period of time, or the point in time when the service is required to be performed.

9. Quality achievement of products, services and organizations

9.1 compliance. An indication or judgement that the product or service meets the requirements of the relevant specification or regulation; also the state of meeting the requirements.

10. General terms: material objects

10.1 Concept of the term 'item'. The term 'item' is used to denote any part, sub-equipment or system that can be individually considered and separately examined or tested. In this standard to avoid repetition, 'item' includes population of items, samples, etc. where the context justifies its use.

10.1.1 item. The term is defined as follows:

- (a) a part, equipment, sub-system or system that can be individually considered and separately examined or tested;
- (b) an actual or conventional object on which a set of observations may be made;
- (c) defined quantity of material on which a set of observations may be made;
- (d) an observed value, either qualitative (attributes) or quantitative (measured).

10.2 population (universe). The totality of items under consideration.

10.3 characteristic. A property that helps to distinguish between items of a given population.

10.4 parameter. A quantity that serves to describe or to characterize the distribution of a population.

10.5 lot/batch. A definite quantity of some commodity manufactured or produced under conditions which are presumed uniform.

NOTE. In some industries 'lot' and 'batch' are not regarded as being synonymous. Where they have distinctly different meanings, these should be defined. Where it is unnecessary to retain the distinction, the word 'lot' is preferred.

10.6 sample. A group of items or individuals, taken from a larger collection or population, that provides information needed for assessing a characteristic (or characteristics) of the population, or which serves as a basis for action on the population or the process that produced it.

NOTE 1. The term may also be used to describe a portion of material taken for the same purpose from a larger bulk of material or a sample of observations.

NOTE 2. Many statistical techniques require that the sample shall be drawn at random.

10.7 specimen. A representative single item or a measured quantity of material.

NOTE. The term is often used in the formation of a sample.

10.8 materiel. Equipment, stores, supplies and spares that form the subject of a contract.

NOTE. This generic term is often used for large scale procurement purposes and avoids the necessity of repeating items covered in this definition (see BS 5750).

10.9 consignment. Goods or products issued or received as one delivery and covered by one set of documents. A consignment may consist of one or more lots/batches.

10.10 quarantine store. A secure place in which all supplies therein await proof of compliance with specified requirements.

10.11 bonded store. A secure place in which only those supplies that have been accepted as satisfactory by the inspection staff should be held.

Section three. Management

11. Quality management

11.1 quality manual. A document setting out the general quality policies, procedures, and practices of an organization.

11.2 quality system

NOTE. This term is defined in BS 4778 : Part 1.

11.3 quality programme. A documented set of activities, resources and events serving to implement the quality system of an organization.

11.4 quality plan

NOTE. This term is defined in BS 4778 : Part 1.

11.5 quality audit

NOTE. This term is defined in BS 4778 : Part 1.

11.6 product quality audit. The independent examination of product quality to provide information.

NOTE. For further information see figure 3.



11.7 process quality audit. The independent examination of process quality to provide information.

NOTE. For further information see figure 3.

11.8 quality system audit

NOTE. This term is qualified by a note to quality audit in BS 4778 : Part 1.

11.9 quality verification. The provision of evidence or proof that requirements for quality have been met.

NOTE 1. Quality assessment and quality validation are considered to be synonymous with quality verification.

NOTE 2. For further information see figure 3.

11.10 quality engineering. The application of appropriate techniques and skills to achieve the required quality.

11.11 vendor appraisal. Assessment of a potential supplier's capability of controlling quality, carried out before placing orders.

NOTE. For further information see figure 3.

11.12 supplier evaluation. Assessment of a supplier's control of quality, carried out after placing orders.

NOTE. For further information see figure 3 and BS 5179.

11.13 supplier rating. An index of the actual performance of a supplier.

11.14 design review

NOTE. This term is defined in BS 4778 : Part 1.

11.15 calibration. All the operations for the purpose of determining the values of the errors of a measuring instrument (and, if necessary, to determine other metrological properties).

NOTE 1. The metrological usage of the term 'calibration' is often extended to include operations such as adjustment, gauging, scale graduation, etc.

NOTE 2. This definition is the same as that given in BS 5233.

12. Economics

12.1 cost(s). The expenditure (actual or notional) incurred on, or attributable to, a given thing.

NOTE. The word 'cost' can rarely stand on its own, and should be qualified as to its nature or limitations (e.g. historical, variable, etc.) and related to a particular thing or 'object of thought' (e.g. a given quantity or unit of goods made or services performed).

12.2 cost function. An expression of the way cost varies with a given parameter.

12.3 quality related costs. The expenditure incurred in defect prevention and appraisal activities plus the losses due to internal and external failure.

12.4 prevention costs. The cost of any action taken to investigate, prevent or reduce defects and failures.

NOTE. Prevention costs can include the cost of planning, setting up and maintaining the quality control system.

12.5 appraisal costs. The cost of assessing the quality achieved.

NOTE. Appraisal costs can include the cost of inspecting, testing, etc. carried out during and on completion of manufacture.

12.6 failure costs, internal. The costs arising within the manufacturing organization of the failure to achieve quality specified.

NOTE. The term can include the cost of scrap, rework and re-inspection, and also consequential losses within the organization.

12.7 failure costs, external. The costs arising outside the manufacturing organization of the failure to achieve quality specified.

NOTE. The term can include the costs of claims against warranty, replacement and consequential losses of custom and good will.

12.8 economic quality. The economic level of quality at which the cost of securing higher quality would exceed the benefits of the improved quality.

13. Safety

13.1 Concept of the term 'safety'. The system approach is being applied to safety in response to the need for a process for optimizing the allocation of limited resources in complex situations. Ideally system safety provides such a process for safety enhancement by taking into account all the hazards and related factors in the life cycle of a product or system that can affect safety in operation. It assesses at various stages of a life cycle the risks this operation may entail, employing at each stage analytical procedures that are consistent with the available information, and consequent uncertainties about the product or systems operation. On the basis of such assessment it supports the rational allocation of available resources so as to attain the minimum cumulative risks. Many variations and even inconsistencies appear in the specific interpretation of the concept.

13.1.1 safety. The freedom from unacceptable risks of personal harm.

NOTE. Safety is defined in context of risk of personal harm. It is traceable quantitatively in decision-making on acceptable risks.

13.2 safety management. The application of organizational and management principles in order to assure with high confidence the timely realization of the goal of optimum safety.

NOTE. Safety management encompasses planning, organizing and controlling those development and operational activities directed towards this goal, including the co-ordinating of all interfaces (internal and external) among them, and evaluating the overall integrated safety programme to assess its capabilities for the attainment of the goal.

13.3 Concept of hazard and risk. The idea of a hazard is limited to a set of existing conditions with the potential for leading to one or more accidents with harmful consequences. For this potential to be realized, an activating change has to occur. Hazard can be classified as, e.g.:

- (a) catastrophic;
- (b) critical;
- (c) controlled or marginal;
- (d) negligible.

Risk can be defined in terms of the probability of occurrence of a hazard, or the consequence. Such a consequence could occur as a result of compounding several different hazards.

The assessment of risk incorporates risk quantification and risk evaluation. This separation can be beneficial in avoiding confusion between the objective process of risk quantifica-