

Reliability of systems, equipment and components —

Part 23: Guide to life cycle costing

ICS 29.020

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This British Standard, having been prepared under the direction of the Management Systems Sector Board, was published under the authority of the Standards Board and comes into effect on 15 February 1997

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The following BSI references relate to the work on this standard:
Committee reference DS/1
Draft for comment 95/402058 DC

ISBN 0 580 27131 5

Amendments issued since publication

Amd. No.	Date	Comments

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National foreword

This Part of BS 5760 has been prepared by the Technical Committee DS/1 and is identical with IEC 300-3-3:1996 *Dependability management — Part 3: Application guide — Section 3: Life cycle costing*, published by the International Electrotechnical Commission (IEC).

This standard gives a general introduction to the concept of life cycle costing.

BS 5760 provides comprehensive guidance on many aspects of reliability management. The Parts so far published are as follows:

- *Part 0: Introductory guide to reliability;*
- *Part 1: Dependability programme elements and tasks;*
- *Part 2: Guide to the assessment of reliability;*
- *Part 3: Guide to reliability practices: examples;*
- *Part 4: Guide to specification clauses relating to the achievement and development of reliability in new and existing items;*
- *Part 5: Guide to failure modes, effects and criticality analysis (FMEA and FMECA);*
- *Part 6: Guide to programmes for reliability growth;*
- *Part 7: Guide to fault tree analysis;*
- *Part 9: Guide to the block diagram technique;*
- *Part 10: Guide to reliability testing;*
- *Section 10.1: General requirements;*
- *Section 10.2: Design of test cycles;*
- *Section 10.3: Compliance test procedures for steady-state availability;*
- *Section 10.5: Compliance test plans for success ratio;*
- *Part 11: Collection of reliability, availability, maintainability and maintenance support data from the field;*
- *Part 12: Guide to the presentation of reliability, maintainability and availability predictions;*
- *Part 13: Guide to reliability test conditions for consumer equipment;*
- *Section 13.1: Conditions providing a low degree of simulation for indoor portable equipment;*
- *Section 13.2: Conditions providing a high degree of simulation for equipment for stationary use in weather-protected locations;*
- *Section 13.3: Conditions providing a low degree of simulation for equipment for stationary use in partially weather-protected locations;*
- *Section 13.4: Conditions providing a low degree of simulation for equipment for portable and non-stationary use;*
- *Section 13.5: Ground mobile equipment — Low degree of simulation;*
- *Section 13.6: Test cycle 6: Outdoor transportable equipment — Low degree of simulation;*
- *Part 14: Guide to formal design review;*
- *Part 15: Guide to the application of Markov techniques;*
- *Part 16: Guide to stress screening;*
- *Section 16.1: Repairable items manufactured in lots;*
- *Part 17: Reliability growth — Statistical test and estimation methods;*
- *Part 18: Reference conditions for failure rates of electronic components and stress models for conversion;*
- *Part 20: Guide to the specification of dependability requirements.*

Further Parts of BS 5760 are envisaged in order to provide guidance on other techniques of reliability management.

NOTE Part 8: *Guide to the assessment of reliability of systems containing software* is currently in preparation and is available as DD 198:1991.

Whilst mainly addressing system and equipment level reliability, many of the techniques described in the Parts of BS 5760 may also be applied at the component level. Further guidance on component reliability is given in BS CECC 00804:1996.

Cross-references

The British Standards which correspond to international or European publications referred to in this document may be found in the current BSI Catalogue under the section entitled "International Standards Correspondence Index".

The Technical Committee has reviewed the provisions of IEC 300-2:1995, to which normative reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 14 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.

Introduction

Today's customers require products that are reliable, that perform their functions safely and that can be easily maintained over their useful lives. Their decision to purchase is not only influenced by the product's initial cost (acquisition cost) but also by the product's expected operating cost and maintenance cost over its life (ownership cost). In order to achieve customer satisfaction, the challenge for suppliers is to design products that are reliable and cost competitive by optimizing acquisition and ownership costs. This optimization process ideally should start at the product's inception and should be expanded to take into account all the costs that will be incurred throughout its lifetime. All decisions made about a product's design and manufacture may affect its performance, safety, reliability, maintainability, maintenance support requirements, etc., and ultimately determine its price and ownership cost.

Life cycle costing is the process of economic analysis to assess the total cost of acquisition and ownership of a product. This analysis provides important inputs in the decision making process in the product design, development and use. Product suppliers can optimize their designs by evaluation of alternatives and by performing trade-off studies. They can evaluate various operating and maintenance strategies (to assist product users) to optimize life cycle cost (LCC). The life cycle cost analysis can also be effectively applied to evaluate the costs associated with a specific activity, for example effects of different maintenance concepts/approaches, to cover a specific part of a product, or to cover only (a) selected phase(s) of a product's life cycle.

Life cycle cost analysis is most effectively applied in the product's early design phase to optimize the basic design approach. However, it should also be used during the subsequent phases of the life cycle to optimize other engineering decisions and facilitate efficient allocation of resources.

Formal application of the life cycle costing process to a product will depend on customer/contract requirements. However, life cycle cost analysis provides a useful input to any design decision making process. Therefore, it should be integrated with the design process, to the extent feasible, to optimize product characteristics and costs.

1 Scope

This section of IEC 300-3 provides a general introduction to the concept of life cycle costing. Although the life cycle costs consist of many contributing elements, this standard particularly highlights the costs associated with dependability of the product.

It is intended for general application by both customers (users) and suppliers of products. It explains the purpose and value of life cycle costing and outlines the general approaches involved. It also identifies typical life cycle cost elements to facilitate project and programme planning.

General guidance for conducting a life cycle cost analysis, including life cycle cost model development, is provided.

NOTE Further supporting sections to this standard are under consideration.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of IEC 300-3. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this section of IEC 300-3 are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50(191):1990, *International Electrotechnical Vocabulary (IEV) — Chapter 191: Dependability and quality of service*.

IEC 300-1/ISO 9000-4:1993, *Dependability management — Part 1: Dependability programme management*.

IEC 300-2:1995, *Dependability management — Part 2: Dependability programme elements and tasks*.

ISO 9004-1:1994, *Quality management and quality system elements — Part 1: Guidelines*.

ISO 8402:1994, *Quality management and quality assurance — Vocabulary*.