

This is a preview - click here to buy the full publication

INTERNATIONAL STANDARD

IEC 60300-3-14

First edition
2004-03

Dependability management –

Part 3-14: Application guide – Maintenance and maintenance support

© IEC 2004 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

X

For price, see current catalogue

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms, definitions and acronyms	8
3.1 Terms and definitions	8
3.2 Acronyms	11
4 Maintenance and maintenance support overview.....	11
4.1 Life cycle aspects.....	11
4.1.1 General	11
4.1.2 Scenarios for maintenance and maintenance support.....	12
4.1.3 Concept and definition phase	13
4.1.4 Design and development phase.....	13
4.1.5 Manufacturing phase	14
4.1.6 Installation phase	14
4.1.7 Operation and maintenance phase	14
4.1.8 Disposal phase.....	15
4.2 Description of maintenance	15
4.2.1 General	15
4.2.2 Maintenance policy and concept.....	15
4.2.3 Indenture levels.....	16
4.2.4 Maintenance echelons.....	16
4.2.5 Preventive and corrective maintenance	16
4.3 Description of maintenance support.....	17
5 Management responsibility	17
5.1 Management commitment.....	17
5.2 Customers.....	18
5.3 Maintenance policy.....	18
5.4 Planning of maintenance and maintenance support.....	18
5.5 Responsibility, authority and communication	18
6 Maintenance process implementation	19
6.1 General	19
6.2 Maintenance management.....	19
6.3 Maintenance and maintenance support planning	20
6.3.1 General	20
6.3.2 Determination of maintenance support.....	21
6.3.3 Maintenance task identification.....	22
6.3.4 Maintenance task analysis.....	23
6.3.5 Identification of maintenance support resources	23
6.4 Maintenance preparation	24
6.5 Maintenance execution.....	24

7	Resource management.....	25
7.1	Provision of resources.....	25
7.2	Human resources	26
7.2.1	General	26
7.2.2	Training.....	26
7.3	Infrastructure.....	27
7.3.1	General	27
7.3.2	Support equipment	27
7.3.3	Built-in test equipment (BITE).....	29
7.3.4	Maintenance facilities	29
7.3.5	Administration and technical facilities	29
7.3.6	Computerized maintenance information systems	30
7.4	Information resources.....	30
7.4.1	General	30
7.4.2	Documentation	30
7.4.3	Maintenance information	33
7.5	Materials and spare parts	34
7.5.1	General	34
7.5.2	Spare parts quantification.....	34
7.5.3	Spare parts identification.....	36
8	Measurement, analysis and improvement	37
8.1	General	37
8.2	Monitoring and measurement	37
8.2.1	General	37
8.2.2	Customer-related measurement.....	37
8.2.3	Maintenance-related measurement.....	38
8.3	Maintenance assessment	38
8.4	Maintenance improvement.....	39
8.5	Modifications	39
	Annex A (informative) Factors affecting maintenance and maintenance support	40
A.1	General	40
A.2	Application to complex systems	40
A.3	Factors during the design phase	40
A.4	Factors during the operation and maintenance phase	41
	Bibliography.....	43
	Figure 1 – Maintenance and maintenance support during the life cycle	12
	Figure 2 – Interrelationship of maintenance terms.....	15
	Figure 3 – Types of maintenance tasks.....	17
	Figure 4 – Maintenance processes.....	19
	Figure 5 – Maintenance and maintenance support planning process	21
	Figure 6 – Spare parts provisioning process	36

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DEPENDABILITY MANAGEMENT –

Part 3-14: Application guide – Maintenance and maintenance support

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60300-3-14 has been prepared by IEC technical committee 56: Dependability.

This first edition of IEC 60300-3-14 cancels and replaces IEC 60706-4, and provides a more general approach to maintenance and maintenance support.

The text of this standard is based on the following documents:

FDIS	Report on voting
56/929/FDIS	56/940/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2009. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

The provision of maintenance and maintenance support is a key element in ensuring the dependability of items (products, equipment and systems) throughout their life cycle. Proper functionality, capability and dependability performance are achieved by providing the necessary maintenance and maintenance support in conjunction with appropriate design, quality manufacturing, and sound operating practices.

The amount and type of maintenance and maintenance support depends on customer needs, the nature of the item, its condition, required availability and other factors. As these factors change, especially during the operation and maintenance phase, maintenance and maintenance support may need to be adjusted.

A number of different functions, such as maintenance management and asset management, include maintenance and maintenance support. This standard does not preclude their use, but does indicate what should be addressed under these headings.

Inadequate, excessive or incorrect maintenance can cause failures, which may significantly reduce the availability of items and result in greatly increased cost due to loss of performance and possible secondary damage. The reduced availability often produces operational penalties and a consequent loss of revenue, which can be significantly greater than the cost of maintenance or even the cost of the original failure. Safety may also be affected and in some industries this may be the most important consideration.

This standard provides a more general approach to maintenance and maintenance support than used in integrated logistic support (ILS). ILS is a method by which all logistic support services are considered and provided for customers as an integral part of product development. This standard addresses the case for complex systems where maintenance and maintenance support need to be adjusted to specific situations during both the design phase and the operation and maintenance phase.

DEPENDABILITY MANAGEMENT –

Part 3-14: Application guide – Maintenance and maintenance support

1 Scope

This part of IEC 60300 describes a framework for maintenance and maintenance support and the various minimal common practices that should be undertaken. The purpose of this standard is to outline, in a generic manner, management, processes and techniques related to maintenance and maintenance support that are necessary to achieve adequate dependability to meet the operational needs of the customer.

NOTE 1 Maintenance and maintenance support are a major element of dependability as described in IEC 60300-1 and IEC 60300-2.

In some cases, regulatory and other mandatory requirements need to be considered. Maintenance and maintenance support requirements and obligations may therefore need to be specified in a contract, which cites this standard.

This standard is intended for use by a wide range of suppliers, maintenance support organizations and users and can be applied to all items.

This standard is applicable to items, which include all types of products, equipment and systems (hardware and associated software). Most of these require a certain level of maintenance to ensure that their required functionality, dependability, capability, economic, safety and regulatory requirements are achieved.

NOTE 2 For consistency, this standard will use the term “item” as defined in 3.1.5, except where the context requires otherwise.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60300-1:2003, *Dependability management – Part 1: Dependability management systems*

IEC 60300-2:2004, *Dependability management – Part 2: Guidelines for dependability management*

IEC 60300-3-2, *Dependability management – Part 3: Application guide – Section 2: Collection of dependability data from the field*

IEC 60300-3-3, *Dependability management – Part 3: Application guide – Section 3: Life cycle costing*

IEC 60300-3-10, *Dependability management – Part 3-10: Application guide – Maintainability*

IEC 60300-3-11, *Dependability management – Part 3-11: Application guide – Reliability centred maintenance*

IEC 60300-3-12, *Dependability management – Part 3-12: Application guide – Integrated logistic support*

IEC 60706-3, *Guide on maintainability of equipment – Part 3: Sections Six and Seven – Verification and collection, analysis and presentation of data*

IEC 60706-5, *Guide on maintainability of equipment – Part 5: Section 4: Diagnostic testing*

IEC 60812, *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)*

IEC 61025, *Fault tree analysis (FTA)*

IEC 61649, *Goodness-of-fit tests, confidence intervals and lower confidence limits for Weibull distributed data*