Australian Standard®

Analysis techniques for system reliability—Reliability block diagram and Boolean methods

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- Australian Chamber of Commerce and Industry
- Australian Electrical and Electronic Manufacturers Association
- Australian Industry Group
- Australian Nuclear Science & Technology Organisation
- Australian Organisation for Quality
- Certification Interests (Australia)
- Department of Defence (Australia)
- Energy Networks Association
- Engineers Australia
- The University of New South Wales

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PREFACE

This Standard was prepared by the Standards Australia Committee QR-005, Dependability.

The objective of this Standard is to describe procedures for modelling the dependability of a system using the reliability block diagram technique as a pictorial representation showing the logical connection of components needed for successful operation. It includes guidance on other methods of analysis such as Boolean disjointing methods. It is suitable for use in conjunction with the AS IEC 60300 series of dependability management Standards.

This Standard is identical with, and has been reproduced from IEC 61078 Ed.2.0 (2006), *Analysis techniques for system reliability—Reliability block diagram and Boolean method*, which is part of a suite of Standards developed by the IEC Technical Committee IEC/TC 56, Dependability.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.

(b) In the source text 'this International Standard' should read 'this Australian Standard'.

(c) A full point should be substituted for a comma when referring to a decimal marker.

The terms 'normative' and 'informative' are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

CONTENTS

INTRODUCTION

Different analytical methods of dependability analysis are available, of which the reliability block diagram (RBD) is one. The purpose of each method and their individual or combined applicability in evaluating the reliability and availability of a given system or component should be examined by the analyst prior to starting work on the RBD. Consideration should also be given to the results obtainable from each method, data required to perform the analysis, complexity of analysis and other factors identified in this standard.

A reliability block diagram (RBD) is a pictorial representation of a system's reliability performance. It shows the logical connection of (functioning) components needed for successful operation of the system (hereafter referred to as “system success”).

STANDARDS AUSTRALIA

Australian Standard

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1 Scope

This International Standard describes procedures for modelling the dependability of a system and for using the model in order to calculate reliability and availability measures.

The RBD modelling technique is intended to be applied primarily to systems without repair and where the order in which failures occur does not matter. For systems where the order of failures is to be taken into account or where repairs are to be carried out, other modelling techniques, such as Markov analysis, are more suitable.

It should be noted that although the word “repair” is frequently used in this standard, the word “restore” is equally applicable. Note also that the words “item” and “block” are used extensively throughout this standard: in most instances interchangeably.

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.

References to international standards that are struck through in this clause are replaced by references to Australian or Australian/New Zealand Standards that are listed immediately thereafter and identified by shading. Any Australian or Australian/New Zealand Standard that is identical to the International Standard it replaces is identified as such.

IEC 60050-191:1990, *International Electrotechnical Vocabulary (IEV) – Chapter 191: Dependability and quality of service*

~~IEC 61025, *Fault tree analysis (FTA)*~~

AS IEC 61025, *Fault tree analysis (FTA)* (identical to IEC 61025)

ISO 3534-1:1993, *Statistics – Vocabulary and symbols – Part 1: Probability and general statistical terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-191 and ISO 3534-1 apply.