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Australian Standard™

Hazard and operability studies (HAZOP studies)—Application guide

Standards Australia

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Hazard and operability studies (HAZOP studies)—Application guide

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PREFACE

This Standard was prepared by the Standards Australia Committee QR-005, Reliability and Maintainability.

This Standard is identical with, and has been reproduced, from IEC 61882:2001, *Hazard and operability studies (HAZOP studies) — Application guide.*

The objective of this Standard is to provide a guide for HAZOP studies of systems utilizing the specific set of guide words defined in this document. It also gives guidance on the application of the technique and on the HAZOP study procedure, including definition, preparation, examination sessions and resulting documentation and follow-up.

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.

None of the normative references in the source document have been adopted as Australian or Australian/New Zealand Standards.

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INTRODUCTION

The purpose of this standard is to describe the principles and procedures of Hazard and Operability (HAZOP) Studies. HAZOP is a structured and systematic technique for examining a defined system, with the objective of:

- identifying potential hazards in the system. The hazards involved may include both those essentially relevant only to the immediate area of the system and those with a much wider sphere of influence, e.g. some environmental hazards;
- identifying potential operability problems with the system and in particular identifying causes of operational disturbances and production deviations likely to lead to non-conforming products.

An important benefit of HAZOP studies is that the resulting knowledge, obtained by identifying potential hazards and operability problems in a structured and systematic manner, is of great assistance in determining appropriate remedial measures.

A characteristic feature of a HAZOP study is the ”examination session” during which a multi-disciplinary team under the guidance of a study leader systematically examines all relevant parts of a design or system. It identifies deviations from the system design intent utilizing a core set of guide words. The technique aims to stimulate the imagination of participants in a systematic way to identify hazards and operability problems. HAZOP should be seen as an enhancement to sound design using experience-based approaches such as codes of practice rather than a substitute for such approaches.

There are many different tools and techniques available for the identification of potential hazards and operability problems, ranging from Checklists, Fault Modes and Effects Analysis (FMEA), Fault Tree Analysis (FTA) to HAZOP. Some techniques, such as Checklists and What-If/analysis, can be used early in the system life cycle when little information is available, or in later phases if a less detailed analysis is needed. HAZOP studies require more details regarding the systems under consideration, but produce more comprehensive information on hazards and errors in the system design.

The term HAZOP has been often associated, in a generic sense, with some other hazard identification techniques (e.g. checklist HAZOP, HAZOP 1 or 2, knowledge-based HAZOP). The use of the term with such techniques is considered to be inappropriate and is specifically excluded from this document.

Before commencing a HAZOP study, it should be confirmed that it is the most appropriate technique (either individually or in combination with other techniques) for the task in hand. In making this judgement, consideration should be given to the purpose of the study, the possible severity of any consequences, the appropriate level of detail, the availability of relevant data and resources.

This standard has been developed to provide guidance across many industries and types of system. There are more specific standards and guides within some industries, notably the process industries where the technique originated, which establish preferred methods of application for these industries. For details see the bibliography at the end of this text.

NOTES

AUSTRALIAN STANDARD

HAZARD AND OPERABILITY STUDIES (HAZOP STUDIES) – APPLICATION GUIDE

1 Scope

This International Standard provides a guide for HAZOP studies of systems utilizing the specific set of guide words defined in this document. It also gives guidance on application of the technique and on the HAZOP study procedure, including definition, preparation, examination sessions and resulting documentation and follow-up.

Documentation, as well as a broad set of examples encompassing various industries, illustrating HAZOP examination is also provided.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60300-3-9, *Dependability management – Part 3: Application guide – Section 9: Risk analysis of technological systems*

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

IEC 61025, *Fault tree analysis (FTA)*

IEC 61160, *Formal design review*

3 Definitions

For the purposes of this International Standard, definitions contained in IEC 60050(191) as well as the following terms and definitions apply:

3.1
characteristic
qualitative or quantitative property of an element

NOTE Examples of characteristics are pressure, temperature, voltage.

3.2
design intent
designer’s desired, or specified range of behaviour for elements and characteristics