SVENSK STANDARD SS-EN 61025

Fastställd	Utgåva	Sida	Ansvarig kommitté
2007-06-25	1	1 (1+52)	SEK TK 56

Felträdsanalys

Fault tree analysis (FTA)

Som svensk standard gäller europastandarden EN 61025:2007. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61025:2007.

Nationellt förord

Europastandarden EN 61025:2007*)

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61025, Second edition, 2006 - Fault tree analysis (FTA)**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-IEC 1025, utgåva 1, 1993, gäller ej fr o m 2010-03-01.

*) EN 61025:2007 ikraftsattes 2007-06-25 som SS-EN 61025 genom offentliggörande, d v s utan utgivning av något svenskt dokument.

ICS 03.120.01; 03.120.99

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

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SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61025

April 2007

ICS 03.120.01; 03.120.99

Supersedes HD 617 S1:1992

English version

Fault tree analysis (FTA)
(IEC 61025:2006)

Analyse par arbre de panne (AAP)
(CEI 61025:2006)

Fehlzustandsbaumanalyse
(IEC 61025:2006)

This European Standard was approved by CENELEC on 2007-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 61025:2007 E

Foreword

The text of document 56/1142/FDIS, future edition 2 of IEC 61025, prepared by IEC TC 56, Dependability, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61025 on 2007-03-01.

This European Standard supersedes HD 617 S1:1992.

The main changes with respect to HD 617 S1:1992 are as follows:

– added detailed explanations of fault tree methodologies;

– added quantitative and reliability aspects of Fault Tree Analysis (FTA);

– expanded relationship with other dependability techniques;

– added examples of analyses and methods explained in this standard;

– updated symbols currently in use.

Clause 7, dealing with analysis, has been revised to address traditional logic fault tree analysis separately from the quantitative analysis that has been used for many years already, for reliability improvement of products in their development stage.

Some material included previously in the body of this standard has been transferred to Annexes A and B.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2007-12-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2010-03-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61025:2006 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60300-3-1	NOTE Harmonized as EN 60300-3-1:2004 (not modified).
IEC 60812	NOTE Harmonized as EN 60812:2006 (not modified).
IEC 61078	NOTE Harmonized as EN 61078:2006 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60050-191	-[1]	International Electrotechnical Vocabulary (IEV) - Chapter 191: Dependability and quality of service	-	-
IEC 61165	-[1]	Application of Markov techniques	EN 61165	2006[2]

[1] Undated reference.

[2] Valid edition at date of issue.

CONTENTS

INTRODUCTION

Fault tree analysis (FTA) is concerned with the identification and analysis of conditions and factors that cause or may potentially cause or contribute to the occurrence of a defined top event. With FTA this event is usually seizure or degradation of system perfomance, safety or other important operational attributes, while with STA (success tree analysis) this event is the attribute describing the success.

FTA is often applied to the safety analysis of systems (such as transportation systems, power plants, or any other systems that might require evaluation of safety of their operation). Fault tree analysis can be also used for availability and maintainability analysis. However, for simplicity, in the rest of this standard the term “reliability” will be used to represent these aspects of system performance.

This standard addresses two approaches to FTA. One is a qualitative approach, where the probability of events and their contributing factors, – input events – or their frequency of occurrence is not addressed. This approach is a detailed analysis of events/faults and is known as a qualitative or traditional FTA. It is largely used in nuclear industry applications and many other instances where the potential causes or faults are sought out, without interest in their likelihood of occurrence. At times, some events in the traditional FTA are investigated quantitatively, but these calculations are disassociated with any overall reliability concepts, in which case, no attempt to calculate overall reliability using FTA is made. The second approach, adopted by many industries, is largely quantitative, where a detailed FTA models an entire product, process or system, and the vast majority of the basic events, whether faults or events, has a probability of occurrence determined by analysis or test. In this case, the final result is the probability of occurrence of a top event representing reliability or probability of fault or a failure.

FAULT TREE ANALYSIS (FTA)

1 Scope

This International Standard describes fault tree analysis and provides guidance on its application as follows:

– definition of basic principles;
  - describing and explaining the associated mathematical modelling;
  - explaining the relationships of FTA to other reliability modelling techniques;
– description of the steps involved in performing the FTA;
– identification of appropriate assumptions, events and failure modes;
– identification and description of commonly used symbols.

2 Normative references

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

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

IEC 61165, *Application of Markov techniques*