

SVENSK STANDARD

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Flyg- och rymdteknik – Grundorsaksanalys och problemlösning (9S-metoden)

Aerospace series – Root cause analysis and problem solving (9S Methodology)

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Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

EN 9136

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2018

ICS 03.120.10; 49.020

English Version

Aerospace series - Root cause analysis and problem solving (9S Methodology)

Série aérospatiale - Analyse de cause racine et résolution de problème (9S méthodologie)

Luft- und Raumfahrt - Ursachenanalyse und Problemlösung (9S Methodik)

This European Standard was approved by CEN on 20 November 2017.

CEN 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 CEN-CENELEC Management Centre or to any CEN 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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 9136:2018) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2018, and conflicting national standards shall be withdrawn at the latest by November 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

SS-EN 9136:2018 (E)

Rationale

The objective of root cause analysis and problem solving is to not only reduce the number of issues (i.e. undesirable conditions, defects, failures), but to minimize their impact on quality, delivery performance, costs, and ultimately on the customer. Often big issues originate with small problems that were discovered too late or were discovered, but were never resolved due to a lack of understanding the actual issue(s), incorrect analysis of the root cause, and/or ineffective actions being taken.

This guidance document was created to provide a methodology for performing root cause analysis to resolve a significant or recurrent issue [e.g. quality, On-Time Delivery (OTD), process, documentation], as guidance within the aviation, space, and defence industry and/or when contractually invoked at any level of the supply chain.

Foreword

In December 1998, the aviation, space, and defence industry established the International Aerospace Quality Group (IAQG) with the purpose of achieving significant improvements in quality and reductions in cost throughout the value stream. This organization, with representation from aviation, space, and defence companies in the Americas, Asia-Pacific, and Europe and sponsored by SAE International, Society of Japanese Aerospace Companies (SJAC), and AeroSpace and Defence Industries Association of Europe -Standardization (ASD-STAN), has agreed to take responsibility for the technical content of this document to promote best practices that would satisfy associated requirements of Aerospace Quality Management System (AQMS) standards (i.e. 9100, 9110, 9120).

To assure customer satisfaction, aviation, space, and defence industry organizations must produce and continually improve safe, reliable products that meet or exceed customer and regulatory authority requirements. This includes having processes in place to detect and eradicate significant and recurrent issues. This document standardizes methodology to perform root cause analysis and problem solving to support these efforts. The establishment of a common methodology, for use by organizations at all levels of the supply-chain should result in improved action plans and a standardized way of exchanging information between organizations and external stakeholders (e.g. suppliers, partners, customers, regulatory agencies).

Introduction

This document has been developed by the IAQG. In accordance with the continual improvement requirements defined in the 9100-series standards (see Clause 8, “Measurement, Analysis, and Improvement”), it was deemed useful to promote those industry recognized best practices for identifying the root causes of nonconformities or undesirable conditions (including potential issues and conditions) and implementing correction(s) and associated corrective/preventive actions. The process described in this document was created by comparing and mixing root cause analysis and problem solving methodologies [e.g. 7 Steps, 8D, Root Cause Corrective Action (RCCA)] used by main actors of aviation, space, and defence industry.

Unless contractually specified, other root cause analysis processes with slightly different sequencing of activities and/or different names of process steps may be acceptable, provided that these activities meet the intent of this document and deliver the same outcomes (i.e. immediate protection, temporary fix, durable solution, systemic improvement) and provides the same level of information.

Throughout this document, the words “should” and “required” indicate strong recommendations to apply and correspond to actions that the authors of this document consider important in order to deliver robust root cause analysis. When strict application of this document is decided by an organization or is mandated by a customer, they shall be interpreted as an obligation to be complied with (i.e. interpreted as “shall” and “must”).

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1 Scope

1.1 General

The objective of any organization, as part of continual improvement, is to reduce the number of issues (i.e. undesirable conditions, defects, failures) and to minimize their impact on quality, delivery performance, and cost.

This includes having processes in place to detect and eradicate significant and recurrent issues, which implies having well identified problems, a common understanding of their impact and associated root causes, and having defined and implemented adequate actions so that these problems, including similar issues will not happen again.

1.2 Purpose

Propose a methodology to improve the way escapes and issues are managed, including communication between all parties [e.g. engineering, Materials Review Board (MRB), manufacturing, manufacturing engineering, supplier, customer] to reduce their impact, contain them as far upstream as possible, and prevent recurrence (i.e. ensure the right measures are taken at the right location and at the right time).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 9100, *Quality Management Systems — Requirements for Aviation, Space and Defence Organizations*

EN 9110, *Quality Management Systems — Requirements for Aviation Maintenance Organizations*

EN 9120, *Quality Management Systems — Requirements for Aviation, Space and Defence Distributors*

EN ISO 9000:2015, *Quality management systems — Fundamentals and vocabulary (ISO 9000:2015)*

3 Terms and definitions

Definitions for general terms can be found in EN ISO 9000 and the IAQG Dictionary, which is located on the IAQG website. An acronym log for this document is presented in Annex A.

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

apparent cause

(also referred to as obvious cause, direct cause, or immediate cause)

event or action that immediately results in or precedes the nonconformity

Note 1 to entry: This is generally NOT the root cause.

3.2

containment

action to control and mitigate the impact of a problem and protect the organization and/or customer (i.e. stop the problem from getting worse), includes correction, immediate corrective action, immediate communication, and verification that problem does not further degrade

3.3

contributing causes

causes that by themselves would not cause the problem, but can increase the risk of the issue to occur. Analysis for these causes generally requires taking a closer look at the existing conditions and associated actions

3.4

correction

(also referred to as Immediate Correction)

action taken to eliminate a detected nonconformity

[SOURCE: EN ISO 9000:2005, 3.6.6, modified]

Note 1 to entry: A correction can be made in conjunction with a corrective action.

Note 2 to entry: For product nonconformity, correction might be understood as reworking the part, accepting the nonconformance through concession process, or scrapping the product.

Note 3 to entry: For a system issue, it may include correcting the paper work or issuing a new purchase order.

Note 4 to entry: For a delivery issue, it may include revising to air transportation instead of delivering product by truck or ship, increasing production rate, etc.

3.5

corrective action

action taken to eliminate the cause of a detected nonconformity or other undesirable situation to prevent recurrence

[SOURCE: EN ISO 9000:2005, 3.6.5, modified]

Note 1 to entry: A correction can be made in conjunction with a corrective action.

Note 2 to entry: Corrective action may address all types of causes (i.e. apparent, contributing, root causes).

3.6

immediate corrective action

action taken to eliminate, prevent, or reduce the probability of any additional nonconformances related to the apparent cause from happening again in the short term

Note 1 to entry: These actions may be temporary and should remain in place until the root cause(s) is identified and permanent RCCA is implemented and verified to be effective.