IEC 62061

Edition 2.0 2024-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Safety of machinery – Functional safety of safety-related control systems

Sécurité des machines – Sécurité fonctionnelle des systèmes de commande relatifs à la sécurité

IEC 62061:2021-03/AMD1:2024-03(en-fr)

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SAFETY OF MACHINERY – FUNCTIONAL SAFETY OF SAFETY-RELATED CONTROL SYSTEMS

AMENDMENT 1

FOREWORD

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Amendment 1 to IEC 62061:2021 has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects.

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

Draft	Report on voting
44/1020/FDIS	44/1024/RVD

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

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

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- reconfirmed,
- withdrawn, or
- revised.

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1 Scope

Replace, in the 6th paragraph, 3rd dash, "IEC TR 63074" *with* "IEC TS 63074".

3.2.52
dangerous failure

Replace, in the source, "IEC 61508-4:2010, 3.6.4, modified – terminology adapted to machinery and figure replaced by textual description and ISO 12100-1:2010, 3.34" *with* "IEC 61508-4:2010, 3.6.7, modified – Terminology adapted to machinery".

4.2 Design process

Replace, in NOTE 1, "Annex H" *with* "Annex G".

6.5.2 Requirements for the control of systematic faults

Replace, in NOTE 2, "IEC 61784-3:2016" *with* "IEC 61784-3:2021".

6.8 Security aspects

Replace, in NOTE 2, "IEC TR 63074" *with* "IEC TS 63074".

Replace, in NOTE 2, "ISO/IEC 27001:2013" *with* "ISO/IEC 27001:2022".

7.3.3.3 Fault exclusion

*Replace, in the 1st NOTE, "*NOTE*" with "*NOTE 1*".*

*Replace, in the 2nd NOTE, "*NOTE*" with "*NOTE 2*".*

7.3.4.2 Relationship of relevant parameters

Add, after the 11th paragraph (*starting with "If the ratio of dangerous failure is estimated less than 0,5"), the following new note and text:*

NOTE 5 Similar to Formula (11), T_{10} is evaluated by $T_{10} = \frac{B_{10}}{n_{op}}$.

For further details, see IEC TS 63394:2023, Clause H.6.

Table 6 – Architectural constraints on a subsystem: maximum SIL that can be claimed for an SCS using the subsystem

*Replace, in NOTE 3, "*7.4.3.2*" with "*7.5.3*".*

7.4.2 Estimation of safe failure fraction (*SFF*)

*Replace, in the 1st paragraph, item b), "*component failure data*" with "*failure rate data*".*

Replace, in the 4th paragraph, Formula (13) with the following new formula:

$$SFF = \frac{\sum \lambda_S + \sum \lambda_{DD}}{\sum \lambda_S + \sum \lambda_D} \approx \frac{\sum \lambda_{DD}}{\sum \lambda_D} \quad (13)$$

*Replace, in the 4th paragraph, "*EXAMPLE 2*" with "*EXAMPLE 1*".*

Replace, in the 4th paragraph, the formula of the first EXAMPLE with the following:

$$SFF \approx \frac{\lambda_{DD1}}{\lambda_{D1}} = \frac{DC_1 \lambda_{D1}}{\lambda_{D1}} = DC_1$$

*Replace, in the 4th paragraph, "*EXAMPLE 3*" with "*EXAMPLE 2*".*

Replace, in the 4th paragraph, the formula of 2nd EXAMPLE with the following:

$$SFF \approx \frac{\lambda_{DD1} + \lambda_{DD2}}{\lambda_{D1} + \lambda_{D2}} = \frac{DC_1 \lambda_{D1} + DC_2 \lambda_{D2}}{\lambda_{D1} + \lambda_{D2}} = \frac{\frac{DC_1}{MTTF_{D1}} + \frac{DC_2}{MTTF_{D2}}}{\frac{1}{MTTF_{D1}} + \frac{1}{MTTF_{D2}}}$$

7.4.3.3 Diagnostic coverage (DC)

Replace, in 1st paragraph, Formula (14) with the following:

$$DC = \frac{\sum \lambda_{DD}}{\sum \lambda_{D}} \quad (14)$$

Figure 8 – Subsystem A logical representation

*Replace, in the title, "*Subsystem*" with "*Basic subsystem architecture*".*

Figure 9 – Subsystem B logical representation

*Replace, in the title, "*Subsystem*" with "*Basic subsystem architecture*".*

Figure 10 – Subsystem C logical representation

*Replace, in the title, "*Subsystem*" with "*Basic subsystem architecture*".*

Figure 11 – Subsystem D logical representation

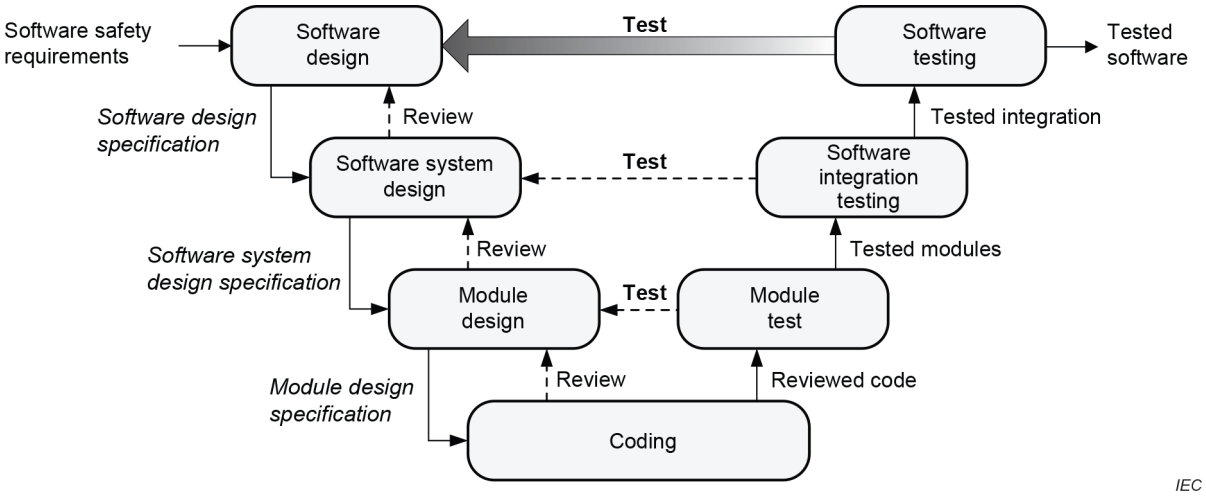
*Replace, in the title, "*Subsystem*" with "*Basic subsystem architecture*".*

8.4.1.2 Software safety lifecycle model – SW level 2

*Replace, in the last sentence of the 2nd paragraph, "*9.5.3*" with "*9.5.4*".*

Figure 14 – V-model of software safety lifecycle for SW level 2

Replace Figure 14 with the following new figure:



A.2.4.2 Frequency and duration of exposure

Delete, in the 3rd paragraph, 1st sentence, the text "(referred to a period ≥ to one year)*".*

Table A.6 – Matrix assignment for determining the required SIL (or PL_r) for a safety function

*Renumber the last "*NOTE 3*" as "*NOTE 4*".*

B.4.2.4.2 Annex H approaches

Replace, in the 2nd dash, "T_2 = 1/C = n_{op}/8 760 h*" with "*T_2 = 1 / C = 8 760 h / n_{op}*".*

B.4.4.2.2 Annex H approaches

Replace, in the 2nd dash, "T_2 = 1/C = n_{op}/8 760 h*" with "*T_2 = 1 / C = 8 760 h / n_{op}*".*

B.4.5.1 Target

*Replace "*6.4.2*" with "*6.4.1*".*

B.4.5.3 Architectural constraints

*Replace, in the 1st paragraph, "*6.4.2*" with "*6.4.1*".*

Table C.1 – Standards references and $MTTF_D$ or B_{10D} values for components

*Add, in the 5th row ("*Hydraulic components 250 000 > nop*" and 3rd column ("*Other relevant standards*"), "*ISO 4413*".*

*Replace, in the 1st sentence of NOTE 3, "*in the subsequent SCS*" with "*provided by another subsystem of the SCS*".*

Table D.1 – Estimates for diagnostic coverage (DC)

*Replace, in the 10th row and last column, "*moving cart*" with "*moving part or final element*".*

Replace, in the 14th row and last column, "(placed in series or in parallel on the logic)*" with "*(placed in series or on two separate inputs of the logic)*".*

E.1 General

*Replace "*two simple qualitative approaches*" with "*a simple qualitative approach*".*

E.2.2 Estimation of effect of CCF

*Replace, in the 1st paragraph, 2nd sentence, "*safety-related parts of the control system*" with "*SCS*".*

Table E.2 – Criteria for estimation of CCF

*Replace, in the title, "*Criteria for estimation of CCF*" with "*Estimation of CCF factor (β)*".*

H.1 Table allocation approach

*Replace, in the 2nd paragraph, 4th dash, "*30 % of the PFH value*" with "*50 % of the PFH value*".*

*Replace, in the 2nd sentence of NOTE 3, "*common cause factor*" with "*common cause failure factor*".*

Figure H.1 – Subsystem A logical representation

*Replace, in the title, "*Subsystem*" with "*Basic subsystem architecture*".*

Figure H.2 – Subsystem B logical representation

*Replace, in the title, "*Subsystem*" with "*Basic subsystem architecture*".*

Figure H.3 – Subsystem C logical representation

*Replace, in the title, "*Subsystem*" with "*Basic subsystem architecture*".*

H.2.4.1 General

*Replace, in 3rd paragraph, "*7.4.3*" with "*7.4.3.2*".*

Figure H.4 – Correlation of subsystem C and the pertinent fault handling function

Replace Figure H.4 with the following new figure and title:

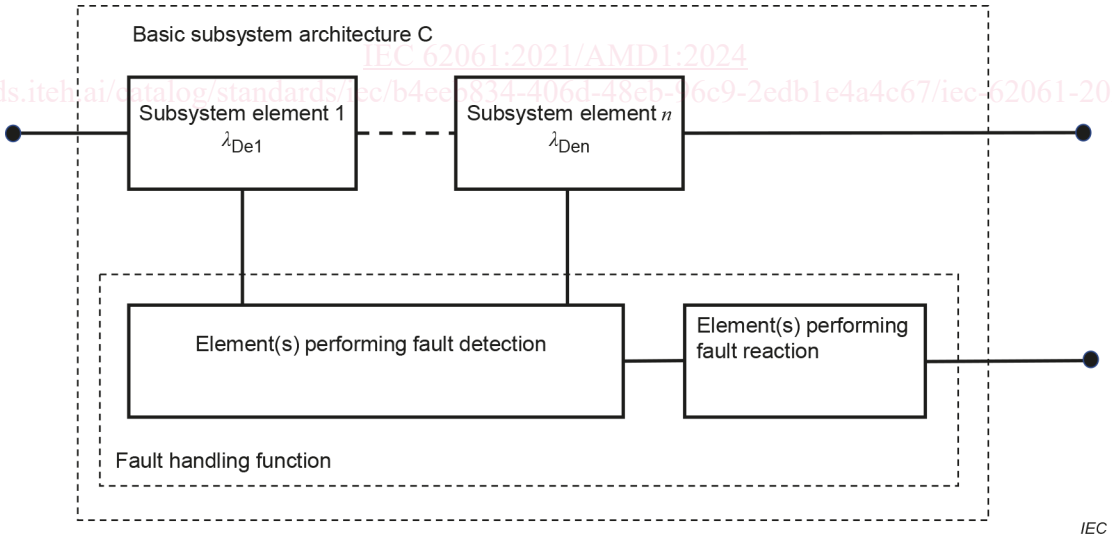


Figure H.4 – Correlation of basic subsystem architecture C and the pertinent fault handling function

Figure H.5 – Subsystem C with external fault handling function

*Replace, in the title, "*Subsystem*" with "*Basic subsystem architecture*".*