



[ISO/TC 199](#)

Safety of machinery

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Secretariat: DIN

Questionnaire by ISO/TC 199/JWG 1 about design of safety-related control systems for machinery

Date of document 2012-05-23

Expected action Reply
Due Date 2012-08-31

Background

Dear Member,

please find enclosed a questionnaire we have received from the Secretariat to ISO/TC 199/JWG 1 with the request to circulate it to all ISO/TC 199 Member Bodies for replying.

For the WORD-version of the questionnaire please check the LL folder 05 "Drop-in box for members"!

You are requested to reply as earliest as possible (preferably by July 2012) but not later than by 2012-08-31.

Yours sincerely,

Dr. Christian Thom, Secretary to ISO/TC 199

Object: Questionnaire about Design of safety related controls/control systems for machinery

Enclosed document: Questionnaire

Dear Body members of ISO/TC 199 and IEC/TC 44,

As you know the ISO/TC 199/JWG 1 has been created to elaborate a common standard based on the merging of ISO 13849-1 and IEC 62061. To confirm the main goals of the future standard, the JWG 1 wants to initiate exchanges with the future standard users.

The first step of these exchanges is to circulate a questionnaire about the existing standards (IEC 62061 and ISO 13849-1&2) to get the feedback of the present users.

For this reason we are now asking the national committees involved in the ISO/TC 199 and the IEC/TC 44 to send the enclosed questionnaire to the national industry actors (machine builders). The objectives of the JWG 1 and of the questionnaire are written on the first page of the Word document. All the requested tasks are also given.

To have easy treatment of the answers received, we have also prepared them on a web site in English, French and German. The links to these online questionnaires are given below:

English:

<https://docs.google.com/spreadsheet/viewform?formkey=dGRnVnlBT3RDMVhFSXIYc2ZOSVltQWc6MQ>

French:

<https://docs.google.com/spreadsheet/viewform?formkey=dFNyMjJJTkVtTHVmXzkzMnp2ZWItZ0E6MA>

German:

<https://docs.google.com/spreadsheet/viewform?formkey=dE5GaGgyeFBialc2MmhZl1QbzR5Snc6MA>

The answers to this questionnaire are requested **by 2012-08-31**. An answer before beginning of July would be highly appreciated.

In case of problem, please do not hesitate to contact me (contact below).

Thank you for your support,

Alexandre BUTAYE

Secretary of ISO/TC 199/JWG 1
UNM

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<p>Scope:</p> <p>Requirements and guidance for the design, the integration and the validation of safety related controls/control systems of machinery regardless of the technology.</p>
<p>Remind of the JWG1 mission – essential items:</p> <ol style="list-style-type: none"> 1) To elaborate a common standard based on the merging of ISO 13849-1 and IEC 62061 (replacement for both existing standards). 2) To make this new standard more user friendly in particular for SMEs. 3) To collect and consider feedback from experienced users of ISO 13849-1 and IEC 62061. 4) To collaborate with standardisation committees responsible for components for which reliability data are necessary. 5) To cover all major machine categories (stationary, transportable, mobile machines, lifting equipment, processing plant) from simple to the more complex. 6) To optimise the ratio between necessary safety requirements specified in the standard and the amount of efforts needed to apply them in practise.
<p>Object of the questionnaire:</p> <ul style="list-style-type: none"> – To initiate information exchange between the industry (standard users) and the standardisation experts. – The collected answers will be analysed in detail by JWG1 in order to identify: <ul style="list-style-type: none"> – The difficulties regarding the application of the current standards from the field – Proposals for improvements – The opportunity to organise symposium/workshops in order to intensify the dialog between standard users and JWG1 members within some countries – The synthesis of the analysis will be forwarded by JWG1 to the participating NCs.
<p>Task requested to National committees, members of ISO TC199 and IEC TC44</p> <ol style="list-style-type: none"> 1) To translate this questionnaire in the National official language(s). 2) To organise the circulation of the translated questionnaire among the local organisations representing the machinery industry (machine manufacturers, integrators, machinery end-users and component manufacturers) involved in specification, design and validation of safety related controls/control systems. 3) To collect the answers and to make a synthesis. <p><u>Note:</u> It is the intention that the questionnaire is answered directly by machine manufacturers and end-users</p>

Questionnaire

Design of safety related controls/control systems for machinery—Experiences with generic standards (in particular ISO 13849-1 and IEC 62061)

Name*:

Name of the company*:

Industry sector (e.g. packaging, machine tool, automotive...):

Country:

Position in the enterprise:

Size of company (or number of employees):

Number of employees in the design office:

Type(s) of machinery produced:

- Manufacturing machinery (wood, metal, plastics...) ☐

- Mobile machinery ☐

- Lifting and hoisting equipment ☐

- Plant equipment (e. g. thermo processing) ☐

- other (please specify) _____

(e.g. Machines of Annex IV of European Machinery Directive)

* not mandatory. Could only be used in case of answers to be clarified for statistics or committee reasons.

N°	Question:	Yes	No
1.	Among the following generic documents, which one(s) are you using? – EN 954-1 (ISO 13849-1:1999) <input type="checkbox"/> – ISO 13849-1:2006 <input type="checkbox"/> – ISO 13849-2:2003 <input type="checkbox"/> – IEC 62061 <input type="checkbox"/> – IEC 61511 <input type="checkbox"/> – IEC 61508 <input type="checkbox"/> – Other standard. Please specify: _____ – Other specification – None <input type="checkbox"/>		
2.	Among the following machine specific standards, which one(s) are you using? ISO 25119 <i>Tractors and machinery for agriculture and forestry — Safety-related parts of control systems. General principles for design and development</i> <input type="checkbox"/> ISO 15998 <i>Earth-moving machinery — Machine-control systems (MCS) using electronic components — Performance criteria and tests for functional safety</i> <input type="checkbox"/> Other (references)?: _____	<input type="checkbox"/>	<input type="checkbox"/>
3.	Who in your company will have to deal with the functional safety design standard? (more than one item may be applicable) – the single automation designer <input type="checkbox"/> – the internal (expert) safety specialist <input type="checkbox"/> – the Technical Manager <input type="checkbox"/> – the Quality Manager <input type="checkbox"/> – the Safety Manager <input type="checkbox"/>		

N°	Question:	Yes	No
	<ul style="list-style-type: none"> – an external (safety) consultant <input type="checkbox"/> – other (please specify) _____ (e.g. documentation department) 		
4.	<p>What kind of technologies are you using in your safety related controls/control systems: (more than one item may be applicable)</p> <ul style="list-style-type: none"> – mechanic: <input type="checkbox"/> – hydraulic: <input type="checkbox"/> – pneumatic: <input type="checkbox"/> – mechatronics: <input type="checkbox"/> – electric: <input type="checkbox"/> – electronic: <input type="checkbox"/> – software: <input type="checkbox"/> 		
5.	Are there any components for which you have difficulties to get realistic reliability data (MTTFd/B10d/PFHd...) that you can use in the PL/SIL calculations?	<input type="checkbox"/>	<input type="checkbox"/>
	<p>If YES, for which kind of component(s) exist(s) difficulties? Please specify: _____ (e.g. valves do not have data available, SIL claim not given of the electrical switches, ...)</p>		
6.	Are you using 'well tried components'?	<input type="checkbox"/>	<input type="checkbox"/>
	<p>If yes, how do you qualify them for the targeted application?</p> <ul style="list-style-type: none"> – with reference to your historical data collected in similar applications <input type="checkbox"/> – verified by tests that can prove reliability in safety related applications <input type="checkbox"/> – Using ISO 13849-2 <input type="checkbox"/> – Using field data analysis (according to e.g. IEC 60300-3-2, ISO 14224, ISO TR 19972-1...) <input type="checkbox"/> <p>Other (please specify): _____</p>		
7.	Have you difficulty integrating mechanical, pneumatic or hydraulic components in the design of Safety Related Control System (or a Safety Related Part of Control System) (e.g. category, level of diagnostic coverage, failure rate, lifetime)?	<input type="checkbox"/>	<input type="checkbox"/>
	<p>If yes, your difficulties are about</p> <ul style="list-style-type: none"> – category definition <input type="checkbox"/> – level of diagnostic coverage (DC /SFF) <input type="checkbox"/> – failure rate data availability <input type="checkbox"/> – lifetime data availability <input type="checkbox"/> – reliability data calculation <input type="checkbox"/> <p>other (please specify) _____</p>		
	<p>If yes, in which way you overcome these difficulties?</p> <ul style="list-style-type: none"> – pure estimations using experience in similar applications <input type="checkbox"/> – buying component from well-known supplier <input type="checkbox"/> – buying component certified form well-known third part Institutes <input type="checkbox"/> – over-dimensioning components <input type="checkbox"/> – duplicating components <input type="checkbox"/> – adding external monitoring <input type="checkbox"/> <p>other (please specify) _____</p>		
8.	Is the concept of the 'safety function' clear for you?	<input type="checkbox"/>	<input type="checkbox"/>
	<p>If NO, the reason is that:</p> <ul style="list-style-type: none"> – the concept described in IEC 62061/ISO 13849-1 too theoretical <input type="checkbox"/> – it is not easy to evaluate when a function has to be considered as 'safety function' or as a normal/standard function <input type="checkbox"/> 		

N°	Question:	Yes	No
	– other (please give other reason(s) _____ (e.g. not clear from risk assessment ISO 12100)		
9.	From which data source do you take the failure rate data? – Component manufacturer reliability data <input type="checkbox"/> – ISO 13849-1 <input type="checkbox"/> – MIL-HDBK 217F <input type="checkbox"/> – SN 29500 <input type="checkbox"/> – IEC/TR 62380 <input type="checkbox"/> – Other (please specify): _____		
10.	Does known accident/incident history influence your safety control systems design? If YES, how do you source the information? Please specify: _____ (e.g. company database, Mil standard, ..)	<input type="checkbox"/>	<input type="checkbox"/>
11.	How do you determine required PL or SIL of a safety function? – IEC 62061 risk matrix <input type="checkbox"/> – ISO 13849-1 risk graph <input type="checkbox"/> – ISO 14121-2 (please identify the method below) Method x: <input type="checkbox"/> Method x: <input type="checkbox"/> Method x: <input type="checkbox"/> Method x: <input type="checkbox"/> – IEC 61508-5 <input type="checkbox"/> – C-type standard <input type="checkbox"/> – Other (please specify): _____		
12.	Please evaluate the difficulty of the tasks when assessing and/or designing safety functions? Please give a note (easy, takes time, hard) <div style="text-align: right; margin-right: 20px;">Easy / takes time / Hard (If Hard, please give reason)</div> – Determination of the required PLr /target SIL <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> _____ – safety function(s) identification <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> _____ – safety function(s) specification <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> _____ – SRECS or SRP/CS design realisation <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> _____ – validation at machine level <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> _____ – other (please specify) _____		
13.	Are you designing according to (designated) architecture types? If YES, which ones? – Category 1, 2, 3 or 4 (ISO 13849-1) <input type="checkbox"/> – Architecture A, B, C or D (IEC 62061) <input type="checkbox"/> – Other (please specify) : _____ <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Are the diagnostic controls you design for your safety functions easy to quantify? If not, what are the difficulties you found? – SRECS or SRP/CS components (elements) have their own internal diagnostic controls and it is not easy to understand their interaction <input type="checkbox"/> – completely self-made control function difficult to quantify <input type="checkbox"/> – other (please specify) _____	<input type="checkbox"/>	<input type="checkbox"/>
14.	How do you validate the safety functions of a machine? – we use ISO 13849-2 <input type="checkbox"/> – we use IEC 62061 <input type="checkbox"/> – we follow operational tests defined in reference to our experience		

N°	Question:	Yes	No
	and knowledge of the machine <input type="checkbox"/> – other (specify) _____		
15.	How do you handle the common cause factors of failure? (more than one item may be applicable) – using separation/segregation <input type="checkbox"/> – using diversity <input type="checkbox"/> – using design application experience <input type="checkbox"/> – using assessment/analysis <input type="checkbox"/> – using specific protection against external environmental influences <input type="checkbox"/> – other (please specify) _____		
16.	Are you using tools/software for making calculations allowing the evaluation of the probability of failure of a safety function? If YES, are these tools, either: – SISTEMA <input type="checkbox"/> – PAScal <input type="checkbox"/> – SET <input type="checkbox"/> – other (please specify) _____ (e.g.: own (Excel/calculation) sheet, internal developed tools) If NO, do you use the simplified method from ISO 13849-1 Table 11?		
17.	If you have suggestion for the committee, please comment (in English to avoid translations). _____ _____		