

## EN ISO 23125:2010+A1:2012

### *Turning machines*

#### Comeback of the old EN 954-1?

On August 24, 2012, Amendment A1:2012 to EN ISO 23125:2010 was published for the first time in the Official Journal of the European Union for the Machine Directive 2006/42/EC. This reintroduces the old, currently expired EN 954-1 to the standard for machine tools.

Against the background that the "very last" transition period for the presumption of conformity of EN 954-1 expired on 31st December, 2011, and that the above mentioned Amendment

was published much later on 24th August, 2012, in the Official Journal of the European Union, this does not necessarily appear to be logical.

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have therefore looked more closely at the machine tool standard with its new Amendment. In the process, they found out that the free choice of the control system standard to be used for machine tools is indeed deceptive.

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#### *Lemma*

With the current amendment of the Machine Tools Standards, the user is given the freedom to choose the Control Standard: old EN 954-1 or new EN ISO 13849-1.

An opposition to almost everything that has been discussed and published in the EU in recent years regarding the transition from the old to the new standard.

The new amendment has therefore made the machine manufacturers and buyers insecure. In particular those who have switched over their production in good time in order to meet the new requirements and therefore made investments.

However, if a closer look is taken, it becomes clear that the current amendment with regard to the application of the old Control Standard runs blank; i.e. also for machine tools there is no way to bypass the EN ISO 13849-1.

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## Comeback of the old control system

With Amendment A1:2012 to EN ISO 23125:2010, first published in the Official Journal of the European Union on 24th August, 2012<sup>1</sup>, in the frame of the harmonized standards pursuant to Machine Directive 2006/42/EC, EN 954-1, which expired by the end of 2011, is reintroduced to the standard for machine tools. At the beginning of the standard, the user is given the following explanation:

*“The replacement of the “safety categories” defined in EN 954-1:1996 by the “performance levels” defined in ISO 13849-1:2006 has been cancelled, because the “presumption of conformity” of EN 954-1:1996 (that is, compliance with EN 954-1:1996 allows the “presumption of conformity” with the Machinery Directive) has been extended. The machine manufacturer now has the choice between two reference standards to take advantage of the “presumption of conformity”;*

Against the background that the "very last" transition period for the presumption of conformity of EN 954-1 expired on 31st December, 2011, and that the above mentioned Amendment was

published much later on 24th August, 2012, in the Official Journal of the European Union, this does not necessarily appear to be logical. However, it becomes more comprehensible by the fact that - as is known to the authors - this Amendment was compiled by the competent standards committee at a time when EN 954-1:1996 had still been in its transition period. At that time, the standards committee had even limited the reference to EN 954-1:1996 to the end of this transition period. It was only after that, that this restriction had "gone missing" in the course of the further formal procedure, which apparently then only ended after the expiration of the transition period.

What effects does this publication of the Amendment through the EU Commission in the Official Journal of the European Union have on control system engineering for machine tools? Does the machine tool builder really have the free choice between two different control system standards?

## Undated / dated references

What is conspicuous in this context is that - in EN ISO 23125:2010 A1:2012 - the

standard EN 954-1 is referred to with its date of issue in some cases, but without this date in others. This has different meanings.

It is common to reference other technical standards in technical standards. These references come in various forms. Sometimes, reference is made to a concrete standard including its date of issue (dated reference). In other cases, reference is only made to the general name of a standard without the concrete date of issue (undated reference). These different forms of citation, which seem to be incidental at first glance, are deliberate and have different meanings. To be more exact, this determines which edition of the technical standard is referred to. Here, it is differentiated between a so called "fixed reference" and a "dynamic reference".

- Using a fixed reference, e.g. „EN 954-1: 1996“, it is referred to exactly this edition of the cited standard.
- Using a dynamic reference, e.g. „EN 954-1“, it is referred to the latest edition of the cited standard. This may then also be the follow-up standard replacing the old one. In this connection,

<sup>1</sup>

EN ISO 13849-1<sup>2</sup> is the follow-up standard of EN 954-1 which expired for good by the end of 2011.

Already in the Internal Regulations of the CEN/CENELEC,<sup>3</sup> the different meanings of the various forms of cross references are explained:

#### 2 Normative references

... For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

#### 6.2.2 Normative references

...

The list shall be introduced by the following wording:

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 23125:2010 A1:2012: therefore also includes a clarifying note:

#### 2 Normative references

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<sup>2</sup> Official Journal of the EU, C 87/1 23.3.2012 and DIN EN ISO 13849-1:2008-12, national preamble, Former edition: DIN EN 954-1:1997-03

<sup>3</sup> CEN/CENELEC Internal Regulations part 3 (20011-12): Rules for the Structure and Drafting of European Standards

*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.*

Section 6.6.7.5 of the CEN/CENELEC Internal Regulations „References to other documents“ states concrete regulations as to how dynamic (here undated) or fixed (here dated) references in a standard have to be designed.

This notation is also common in other legal sectors where normative references play an important part as well. For more details, see e.g. contract law, „Marktzugang und Marktzulassung mittels Normen und Standards“<sup>4</sup> (Access and admission to the market using norms and standards).

### Presumption of conformity of revered standards

Article 7 of the Machine Directive 2006/42/EC determines the following:

2. Machinery manufactured in conformity with a harmonized standard, the references to which have been

*published in the Official Journal of the European Union, shall be presumed to comply with the essential health and safety requirements covered by such a harmonised standard.*

Not all standards referenced in a harmonized standard, however, have ever been published in the Official Journal of the European Union. In other cases, their source had been published, but has been deleted in the meantime.

In § 110 of the EU Guideline for the application of the Machine Directive<sup>5</sup> 2006/42/EC, the EU Commission writes:

*„...The presumption of conformity ceases when the standard is replaced by a new or revised standard on the “date of cessation of presumption of conformity” that is specified in the OJEU for machinery placed on the market after that date.“*

Furthermore, it says here:

*„Where a standard or part of a standard is referred to by a normative reference in a European harmonised standard, the specifications of the standard or parts of the standard referred to become part of the harmonised standard and their application confers a presumption of conformity with the essential health*

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<sup>4</sup> Prof. Dr. Ing. Norbert Müller u.a., DIN Mitteilungen March 2007

<sup>5</sup> <http://www.maschinenrichtlinie.de/dokumente-maschinenrichtlinie.html#c176>

and safety requirements they cover. This remains true, even if the standard referred to is no longer in force (unless its reference has been withdrawn from the OJEU following a formal objection ...)"

This means that in a C-standard, a standard no longer in force may principally be referred to. However, this is usually a concrete edition of a standard to which it is referred using a fixed or dated reference, as e.g. to EN 954-1:1996. For a standard to which it is referred in a dynamic or undated reference, as e.g. EN 954-1, such interpretation is not necessary in most cases. It refers to the current edition of the standard or the latest edition of the follow-up standard anyway which can usually be expected to be in force and listed in the Official Journal of the European Union. It is already doubtful whether the above mentioned interpretation in the EU Guideline for the application of the machine directive would withstand a legal review in the first place. However, answering this question doesn't matter in answering the question posed in this article.

## Which control system standard for lathes?

In many cases, ISO 23125:2010 A1:2012 references EN ISO 13849-1:2006 as well as EN 954-1:1996 with regard to the control system standard applicable to turning machines. This so called fixed reference precisely means the said concrete edition of this standard. At other points, however, the standard is cited without the year (undated) and - with this dynamic reference - the standard refers to the latest edition of the respective standard or, in case of the 954-1, to the latest edition of the follow-up standard, i.e. EN ISO 13849-1 (see above).

What is interesting for the outcome of this article is the determination of the related control system standard using a dynamic reference:

### **Table 3** „Overview of hazards“

- Failure of control system:  
Relevant type-B standard  
→ EN 954-1

### **5. General requirements**

*An analysis of the failure of machine components, including failure in the control system(s), is part of the risk assessment and guidance on this subject and is given in ISO 13849-1 or in EN 954-1.*

### **5.8 Specific requirements resulting from unexpected start-up, over-run or over-speed Hazards**

b) The requirements for failure/disorder of the control system are the following:

1) Control systems shall be designed in accordance with ISO 4413, ISO 4414, IEC 60204-1 and with ISO 13849-1 or EN 954-1

### **5.11 Specific requirements resulting from failure of the control circuit hazards**

a) ... Safety functions of control systems shall be implemented using safety-related parts designed, constructed and applied in accordance with ISO 13849-1 or EN 954-1.

b) The safety functions shall fulfil the accordant requirements given in this subclause.

**The manufacturer has the choice between two reference standards, a combination of both is not foreseen:**

- If ISO 13849-1 is applied, the required performance level (PLr) shall be fulfilled.
- If EN 954-1 is applied, the required category shall be fulfilled.

## Programmable control systems

EN 954-1:1996 includes a couple of warning notes with regard to programmable control systems.

In this connection, it says in section 4.3:

*It is believed at present that it is difficult to determine with any degree of certainty in situations when a significant hazard can occur due to the maloperation of the control system that reliance on correct operation of a single channel of programmable electronic equipment can be assured. Until such time that this situation can be resolved, it is inadvisable to rely on the correct operation of such a single channel device (according to 12.3.5 of EN 60204-1: 1992).*

Furthermore, EN 954-1:1996 does not include explicit measures for the safety of software (logic units pursuant to Annex IV of the Machine Directive 2006/42/EC). Here, it is referred to the following text passages - even if informative in section E.I:

- *prEN 50100-1 \*) Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests*
  - *EN 61000-4-1 Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 1: Overview of immunity tests - Basic EMC publication (IEC 1000-4-1 : 1992)*
- *IEC 15081) Functional safety: safety-related systems (provisional title)*

- *DIN V VDE 0801 Principles for computers in safety-related computer systems, January 1990*
- *HSE Guidelines - Programmable Electronic Systems in Safety-related Applications Part 1 (ISBN 0 11 883906 6) and Part 2 (ISBN 0 11 883906 3) Personal Safety in Microprocessor Control Systems (CECR-184, Elektronikcentralen, Denmark)*

As most passages in these are not normative, however, the user of EN 954-1 would be forced to additionally use the IEC 61508 series to the undated edition of which it is referred (see „IEC 1508“ above) in case of programmable systems. This is irrelevant when using EN ISO 13849-1 which covers this subject.

## Conclusion

The seemingly free choice for the machine tool manufacturer turns out to be a false conclusion when taking a closer look:

1. EN ISO 23125:2010 A1:2012 refers to the latest edition of the standard in passages including a dynamic reference to EN 954-1, and thus to the current edition of EN ISO 13849-1 as things stand today. From this follows, that these parts of the control system must be

designed and built pursuant to EN ISO 13849-1 at present.

2. The mixing of different control system standards in one single machine control system is not permissible pursuant to the present standard (see 5.11 b). From this follows, that also the remaining part of the control system of the machine tool must be designed and manufactured pursuant to EN ISO 13849-1.

As essential parts of the control system must invariably be designed and built according to EN ISO 13849-1, EN 954-1:1996 cited in EN ISO 23125:2010 A1:2012 is practically of no relevance and meaningless. Therefore, there is no way around EN ISO 13849-1 also for machine tools as things stand today. The authors of the standard could have described this in a simpler way.

What remains to be said in the end:

If one looks straight ahead and then makes a - time-related - back somersault, one will have a quick glance at the past, but find out that after landing one is still looking ahead.



*Verfasser*

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