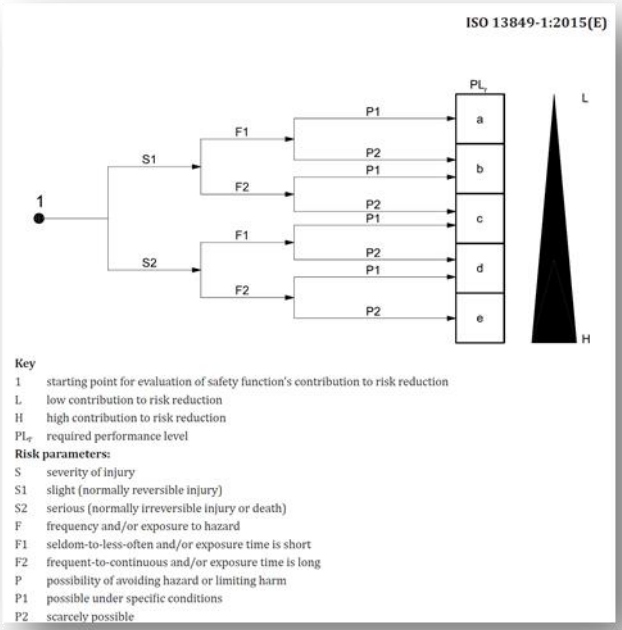
United States TECHNICAL ADVISORY GROUP
ISO Technical Committee 199 – Safety of Machinery

To: Machinery / Machine Tool Builders
From: U.S. TAG to ISO/TC199 (Safety of Machinery)
Re: **Revision of ISO 13849-1 202X Functional Safety**
Date: 24 April 2020

ISO 13849-1 (2015) *Safety-related parts of control systems - Part 1: General principles for design* is currently being revised under Work Group 8 of ISO/TC199. This is the standard that specifies machine control system functional safety Performance Levels and includes this well-known diagram:



Annex A of the published 2015 version of ISO 13849-1 includes the following text:

> **A.2.3 Possibility of avoiding the hazardous event P1 and P2 and probability of occurrence**
> The probability of avoiding the hazard and the probability of occurrence of a hazardous event are both combined in the parameter P. When a hazardous situation occurs, P1 should only be selected if there is a realistic chance of avoiding a hazard or of significantly reducing its effect; otherwise P2 should be selected.
>
> Where the probability of occurrence of a hazardous event can be justified as low, the PLr may be reduced by one level, see A.2.3.2. (highlighting added)

This language was developed primarily for applications with sufficient history of no/few incidents and would thus not require the higher PLr. Research has shown that two-level rating systems tend to be conservative, sometimes resulting in higher evaluations than might otherwise be warranted (Chinniah et.al., IRRST 2011). This allowance was included in the 2015 edition despite some opposition, because some national members were struggling with the conservative and hence overly prescriptive PLr derivations for some types of machinery.

In the current DIS of the revision, this language has been deleted. The standard writers in Work Group 8 who are revising this standard have had several discussions on this allowance, and this language has been removed, added back, and removed again a few times. At the conclusion of the last discussion, the majority voted to remove this allowance. The primary fear was centered on the possibility that engineers might abuse this allowance. Some U.S. members of WG8 who work for, or with, machine manufacturers were in favor of keeping it but unfortunately, they were in the minority.

The revision of this standard is now at the draft stage where only national consensus positions and comments are accepted. If this allowance language is considered sufficiently important to add back into the standard, the U.S. could submit such a comment. However, to be successful we will need solid arguments based on real world applications where the omission of this language can be shown as detrimental. The sort of data we would need (bullets below) would be exceedingly helpful to not only develop a consensus U.S. position, but also, to prevail in that position at the ISO level and overturn the current disallowance.

We need to find manufacturers who:

- are using PL_rs now;
- are, or may be considering the use of this allowance;
- would object to its removal; and
- are willing to assist to reverse it by providing us with at least some idea of your support for a U.S. position, and better yet, some cursory or even anecdotal information to that effect.

If you have an opinion on this allowance, or have data to support its reintroduction, please provide that information to us by no later than close of business, 6 JULY 2020. Any information provided will be kept in strict confidence as to source and will be disclosed only in an aggregate form as necessary.

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