

# Safety – Seminars

## The road to a safe machine.

A guide for manufacturers and operators.

### Module 4: In-depth SISTEMA training

#### Module description:

The general objective of the Machinery Directive is to keep potential hazards posed by machines to a minimum by reducing risk in a systematic way. So, it's not easy to reconcile safety, ergonomics, resistance to manipulation, production performance, documentation and price. The DIN EN ISO 13849 safety standard provides a framework to implement control systems for safety functions. Structures and reliability calculations allow a determination to be made as regards to a performance level (PL), which must be appropriate to the potential risk of a hazard and documented accordingly.

But don't worry: The pragmatic approach of ISO 13849 is relatively easy to implement and won't necessarily make the designer's work more complex.

As part of our in-depth SISTEMA training, examples will be used to allow you to become more acutely aware of how the safety standard is applied, familiarize yourself with SISTEMA software, and the functions it offers. You'll be trained in how to use this tool effectively, creating a kind of "routine" in the process. Based on practical circuits, safety-related circuits will be analyzed, appropriate block structures formed, structural elements and data entered into SISTEMA, and result data will then be determined and interpreted.

Using various circuits and special features, we'll present some tips and options on how to improve structural representations, and how to ultimately determine results. Various methods for documenting projects will be taught alongside SISTEMA.

This workshop is not linked to a manufacturer, and very hands-on. The participants will work independently in small groups on their personal notebooks, supervised by the seminar leader.

#### Contents:

- Introduction and exercise
  - Dual-channel example circuit, determining the safety-related block diagram
  - Determining cat, MTTFD, DC, CCF, PFHD, performance level (PL)
- SISTEMA, accompanying all of the following examples.
  - Structure, functions, options
  - Defining projects and security functions, risk assessment
  - Forming structures, inputting data
  - Determining PFHD and PL
  - Using manufacturer libraries
  - Creating your own libraries

- Documentation printout
- Background knowledge, expert settings
- Question and answer session, discussion
- SISTEMA examples and exercises
  - Single channel structure
  - Dual-channel structure
  - SISTEMA examples: various structures and variants, safety PLC, safe bus systems
- Features, tips, effective work
  - Connecting door switches in a series
  - Working with many actuators
  - Single-channel wiring in a dual-channel structure
  - Tips: You've not reached the performance level you were looking for... What do you do now?
- Project procedure and documentation

**Duration:**

- Approx. 6 - 8 hours

**Required:**

- Basic knowledge of DIN EN ISO 13849 is assumed. (cf. Safety Module 1)
- Notebook with the latest version (Vers.2.x) of free SISTEMA software.

**Trainers:**

- Thomas Krusen, Dominik Holtkötter, Dustin Hollenberg

**Training location:**

- At our Duisburg location
- At your location  
plus travel expenses
- Online

**Certificate of participation:**

- Digital for online training courses, paper for face-to-face training courses

**Training materials:**

- Digital

**Number of participants:**

- Min. 4 participants, max. 10
- If there are more than 10 participants, we can divide the course into several groups and hold it on consecutive days.

**Price:**

- 470€ per participant (plus travel expenses)