

General Information

Rockwell Automation offers this training in cooperation with TÜV Rheinland.

This is a 3.5 day training course providing classroom style instructions mainly intended for application engineers and system integrators detailing the requirements of EN 62061, EN ISO 13849-1 and -2 in order to achieve Functional Safety for Machinery applications.

Experienced engineers in the area of Functional safety are invited to sit an optional exam on the last day of the course. A passing grad in the exam is a pre-requisite for the award of the globally recognised TÜV Functional Safety Engineer mark.

Target Group

Application engineers and system integrators with some experience in Functional Safety; also designers and safety specialists working in Machinery applications.

Contents

The new standards for Functional Safety as well as the new European Machinery Directive require that persons and organisations performing responsible (accountable) tasks during the life cycle phase of a machine have to acquire and prove their competencies in Machine Safety.

Within this training the requirements for the design as well as the proof of Functional Safety for Machinery applications are described and discussed in detail based on the relevant current standards.

The selection of protective devices for Machinery in order to achieve the required risk reduction is shown. Examples of safety functions are explained. The main requirements of EN ISO 13849 and EN 62061 for the design of safety related parts of machine control systems are presented and application examples illustrating the quantitative assessment of safety functions are discussed.

Trainers

Dr. Peter **Robben** and Dr. Thorsten **Gantevoort**.

Both work as safety inspectors for Machine Safety at TÜV Rheinland Industrie Service GmbH.

Agenda

Day 1:

Introduction „TÜV Functional Safety Program“

- **European Guidelines, Standards**

Machinery Directive, A, B and C standards,
Standards and status of standards regarding Functional Safety in Machine safeguarding,
Importance (meaning) of harmonized and non-harmonized standards,
Machines and safety components in terms of appendix IV of the Machinery Directive.

- **Risk Analysis**

Methods for determination of necessary measures for the reduction of risks at machines (ISO 12100, ISO 14121),
Direct, indirect and indicative safety,
Procedures according to EN 954-1, ISO 13849-1, IEC 61508 and EN 62061, examples,
Comparison of safety classifications.

- **ISO 13849-1:1999 (EN 954-1)**

Content and importance (meaning) of safety categories,
Principle information regarding deterministic fault consideration, faults and fault exclusions according to ISO 13849-2,

Importance (meaning) of EN 954-1 for single devices and complete safety functions.

Agenda (cont.)

- **Safety Devices**
Systematic of safety devices, advantages and disadvantages, installation requirements, configuration of safety devices.

Guards, interlocking devices:

- Types, examples regarding application, installation requirements acc. to different safety categories
- Faults, fault exclusions
- Normative requirements

Other safety devices:

- Types, installation requirements, advantages and disadvantages
- Calculation of safety distances

Day 2:




- **Safety functions of machines**
Start/re-start interlock, start functions, Emergency off, emergency switching off, stop categories, muting etc., Realization according to the different safety categories.
- **Circuits, schematics, examples**
Connection of safety devices to controls, interface circuits, Realization according to the different safety categories, Examples for correct and incorrect typical circuits.
- **New standards regarding safety of machinery**
Importance (meaning) of these standards regarding quality management, documentation and safety related availability.

Day 3:

- **EN ISO 13849-1:2008**
Contents of ISO 13849-1, application area, restrictions regarding applicability, Documentation requirements and quality management, Requirements regarding SW, Use of standard components in safety functions, Proof of safety, verification and validation of safety functions, Examples.
- **Validation**
Validation according to ISO 13849-2.
- **EN 62061:2005**
Content of EN 62061, application area, Documentation requirements and quality management, life cycle model, Meaning of terms SIL, SIL CL, HFT, SFF and their context, Requirements regarding safety relevant application software, Proof of safety, verification and validation of safety functions, Examples.

Day 4:

- **Examples**
Examples for proof of Functional Safety according to EN 62061, Examples for proof of Functional Safety according to ISO 13849-1
- **Questions and answers, discussion**
- **Examination (3 hours)**

Dates	14 – 17 March 2011 6 – 9 June 2011 12 – 15 September 2011 Start 1. Day: 9:30 a.m. (other days 9:00 a.m.) End: 5.30 p.m.
Working Material	The standards EN ISO 13849 part 1 and part 2, EN 62061 and (IEC 61508 part 1 to part 7) are required working material for the course and need to be brought along by the participants.
Entry Requirements	This training is designed to provide benefit for engineers with some experience in Functional Safety. It is highly recommended that participants either have experience in Safety of Machinery applications or have attended an introduction course on Functional Safety.
Exam	Day 4 of the training: Start: approx. 2 p.m. End: approx. 5 p.m. The exam consists of 70 multiple choice questions and 12 open questions. The standards EN ISO 13849 part 1 and 2 and EN 62061 are essential working material for the exam. Additionally a calculator should be brought along for the quantitative assessment.
Eligibility Requirements for TÜV Functional Safety Engineer	The following (additional) requirements have to be met in order to receive the TÜV FS Engineer certificate: <ul style="list-style-type: none">▪ Minimum of 3 to 5 years experience in the field of Functional Safety.▪ University degree (Master's or Bachelor's degree in Engineering) or equivalent engineer level responsibilities status certified by employer. Registered participants will receive a form sheet for proof of eligibility from TÜV Rheinland. Exam participants will receive individual notification of results and the TÜV FS Engineer certificate (if exam has been passed and eligibility requirements are fulfilled) from TÜV Rheinland.
Fee	£ 1,925.00 + VAT Including the exam £ 1,695.00 + VAT Without exam and TÜV FS Engineer certificate
Registration	Registration has to be made to Rockwell Automation. Each participant will receive an official confirmation of registration and after participation in the training a confirmation of participation from Rockwell Automation.
Location	Rockwell Automation Training Centre Denbigh Road Bletchley Milton Keynes MK 1 1EP United Kingdom
Organizer	Mr. Brett Spindler  07773 54 77 23 Mail bspindler@ra.rockwell.com
TÜV FS Engineer Certificate	Should you wish more information about the TÜV Functional Safety Engineer certificate or the TÜV FS Program kindly contact: Ms. Veronica Gras  + 49 – 221 – 806 2981  TÜVRheinland® Mail veronica.gras@de.tuv.com Precisely Right. www.tuvasi.com