

# Functional Safety Development in Greater China

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# Mr. Bin Zhao

- **General Manager, Industrial Services**

- Functional safety training for many famous companies, such as BMW, FOTON, BJEV, Siemens, Shanghai automotive, Changchun FAW, UAES, CHERY and Great wall automotive etc.
- Functional safety training or certification of many famous international companies, such as ABB, Siemens, Schneider, Rockwell, Foxboro, Yokogawa, GE, Honeywell etc.
- Functional Safety management system(IEC 61508, IEC 61511, ISO 26262), laboratory management system (ISO17025) lead auditor and factory inspector
- Committee member of China Functional Safety and China Machinery Standard Committee
- Committee member of China Robot Standard Committee
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# Agenda

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- Overview the whole functional safety area
- China safety instrumented system related standard
- China safety instrumented system related regulation
- What TUV Rheinland GC are doing for functional safety in process industry
- Summary

# Overview the whole functional safety area

# Overview the whole functional safety area



# China safety instrumented system related standard

# Related Standards

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- GB/T50770-2013

Code for design of safety instrumented system in petrochemical engineering

- GB/T50823-2013 (incl. SIS)

Code for computer control system design of oil / gas fields and pipelines

# Related Standards

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- GB/T32202-2015

Assessment requirement - safety instrumented system in oil / gas transportation pipeline engineering

- GB/T32203-2015

Validation requirement - safety instrumented system in oil / gas transportation pipeline engineering

# Related Standards

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- GB/T20438 (IEC 61508)

Functional Safety of electrical / electronic / programmable electronic safety related systems

- GB/T21109(IEC 61511)

Functional safety: Safety instrumented systems for the process industry sector

# China safety instrumented system related regulation

# Related Regulations

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- The work safety Law of the PRC

- Implement on Dec. 1<sup>st</sup>, 2014

- No.93 by hazardous chemicals division of SAWS, 2011

“Notice on evaluation criteria for safety standardization”

- Issued on Jun. 20<sup>th</sup>, 2011

- No.76 by hazardous chemicals division of SAWS, 2013

“Notice on promoting safety design management for chemical construction projects”

- Issued on Jun. 20<sup>th</sup>, 2013

Notes : SAWS-State Administration of Work Safety

# Related Regulations

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■ No.88 by hazardous chemicals division of SAWS, 2013

“Guidelines on promoting chemical process safety management”

➤ Issued on Jul. 29<sup>th</sup>, 2013

■ No.129 by hazardous chemicals division of SAWS, 2013

“Notice for comparative study on safety standards of chemicals and metallurgy fields”

➤ Issued on Aug. 26<sup>th</sup>, 2013

■ Announcement of SAWS, 2014

“The criteria for acceptable individual risk and social risk for hazardous chemicals production and storage”

# Related Regulations

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■ No.116 by hazardous chemicals division of SAWS, 2014



“Guidelines for promoting chemical safety instrumented system management”

- Issued on Nov.13th, 2014
- Specific regulation for SIS
- Compliance to international standard IEC 61511 (GB/T21109) and IEC 61508(GB/T20438)
- Specify → hazard and risk based

# Related Regulations

■ No.116 by hazardous chemicals division of SAWS, 2014

- Main contents:

- |   |  |      |
|---|--|------|
| 1. Importance                           |   | Why  |
| 2. Foundation (personal qualification)  |  | How  |
| 3. Whole life cycle management          |  |      |
| 4. Other instrument protection measures |  | When |
| 5. New projects                         |  |      |
| 6. Systems in service                   |  |      |
| 7. Other requirements                   |  |      |

# Related Regulations

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■ No.116 by hazardous chemicals division of SAWS, 2014

- Main requirements:

- |  |  |
|--|--|
| 1. Basic information                     | 7. Design                              |
| 2. Trainings                             | 8. FSM                                 |
| 3. Technical standards and certification | 9. Alarm management                    |
| 4. Analysis and confirm safety function  | 10. BPCS management                    |
| 5. Design                                | 11. Gas detection & protection systems |
| 6. Installation & commissioning          | independent with non-safety system     |

# Related Regulations

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■ No.116 by hazardous chemicals division of SAWS, 2014

- Main deadline:

- 2016-01-01 Large end user
- 2018-01-01 New project with big risk
- 2020-01-01 Other new project

# Related Regulations

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- No.116 by hazardous chemicals division of SAWS, 2014
  - Requirement for end user:
    - Functional safety management
    - Investment for safety
    - Modification for the old non-safety system to reduce the risk

# Related Regulations

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■ No.116 by hazardous chemicals division of SAWS, 2014

- Marketing surveillance:
  - Functional safety assessment
  - Functional safety management
  - Other safety protection measures
  - Personal training

# What TUV Rheinland GC are doing for functional safety in process industry

# Our Services

## Service Areas



## Service Types



Qualification of Employees

Auditing of Management System

Inspection & Evaluation of Products, Systems and Applications

Test of Products, Systems and Applications

Certification of Products, Applications and Management Systems

# FS Engineers qualification

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- More than 1000 engineers got the FSE certificate form TUV Rheinland China (include IEC61511, IEC61508, ISO26262, ISO13849 and IEC62061)
- More than 5000 engineers got training form TUV Rheinland China

# FS certified products

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## ■ Logic solvers (Safety PLC)

- First SIL3 logic (HiaGuard), Dec. 18th, 2012
- ....

## ■ Sensor & final elements

- Intelligent transmitter SIL2/3, Dec. 2012
- Ball valve, Oct. 2014
- ...

## ■ Others

- Safety relay
- Safety barrier
- ...

# Integrator End users

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- SIL assessments
- Management system
- Related trainings

# Summary

# Summary

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- Recent accidents make enterprise interest
- Government attention-Standard and regulation in China
- Increasing requirements for related person, organization, products
- More functional safety trainings
- Extensive application

# Summary

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## ■ What should be done?

### End user

- Risk assessment to decide the SIL and safety function
- Functional safety assessment according to IEC61511
- Operation and maintenance management procedure according to IEC61511
- Train the engineer according to IEC61511

# Summary

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## ■ What should be done?

### System Integrator

- Functional safety management system according to IEC61511
- Train the Engineer according to IEC61511
- Functional safety assessment according to IEC61511

# Summary

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## ■ What should be done?

### Product manufacturer

- Product design according to IEC 61508 and application standard
- Functional safety management system according to IEC61508
- Train the Engineer according to IEC61508

# Functional Safety Development in Greater China

## Thank you!

**Bin Zhao**

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