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Instrument & automation workshop

OGP – London November 21 and 22, 2006

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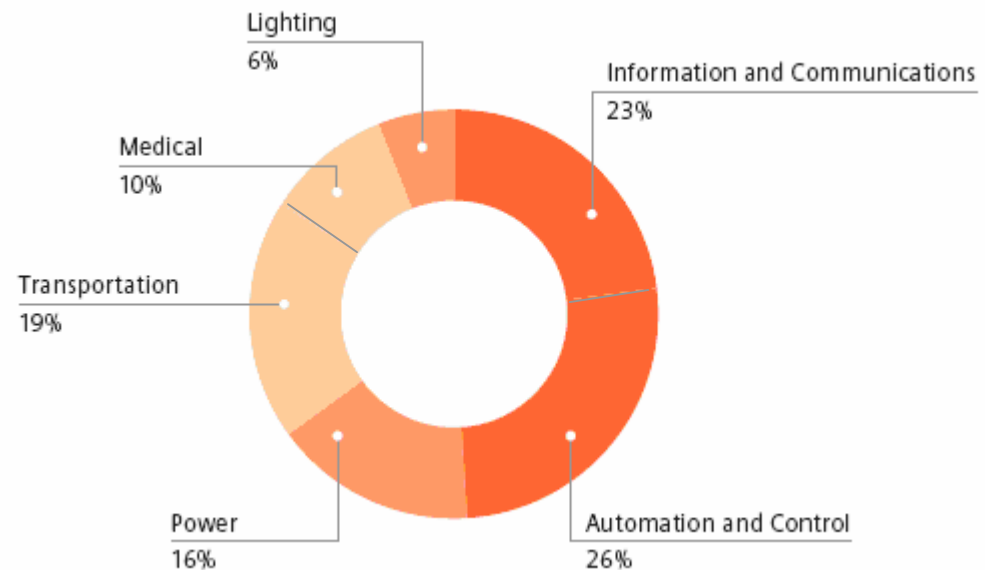
- Presentation of Siemens
- Company and project standards
- Standards referred to in company and project standards
- Experiences
- Need for development
- Recommendations

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SIEMENS – Key figures

- 460 000 employees world wide
- € 75,5 billion sales
- € 5,2 billion invested in R&D
(fiscal year 2005)



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- Automation and Control
 - Automation and Drives (A&D)
 - Industrial Solutions (I&S)
 - Siemens Building Technology (SBT)Supplies products, systems, solutions and services for industrial and building automation and for airport and postal logistics
- Power
 - Power Generation (PG)
 - Power Transmission and Distribution (PTD)Offers a full range of energy solutions, ranging from electricity production to transportation of electrical energy from power plant to consumer

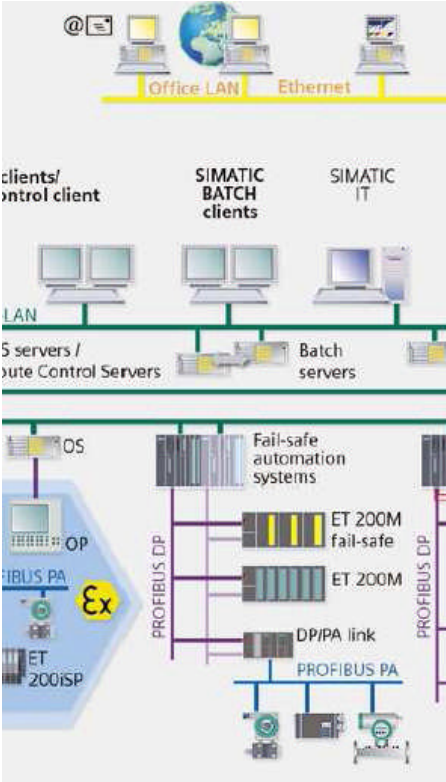
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Standards, regulations and specifications throughout the lifecycle

Equipment



Systems



Projects



SIEMENS**Equipment and Systems**

Product Group	Standard	Committee
Industrial Automation Systems	IEC 61131 Programmable Control	IEC TC 65
	IEC 61499 Function Blocks	IEC TC 65
	IEC 61804 Function Blocks for Process Control	IEC TC 65
	IEC 61987 Measuring Equipment / Electronic Catalogue	IEC TC 65
	IEC 61512 Batch Control Systems	IEC TC 65
	IEC 62264 Enterprise Control	IEC TC 65
	IEC 61158 Fieldbus Systems	IEC TC 65
	IEC 61784 Fieldbus Profile Sets	IEC TC 65
LV Switchgears	IEC 60947 Low-voltage Switchgear	IEC TC 17
	IEC 62026 Actuator/Sensor-Interface	IEC TC 17
Drive Systems	IEC 60034 Rotating Electrical Machines	IEC TC 2
	IEC 61800 Power Drive Systems	IEC TC 22
Installation Technology	IEC 61008 Circuit-breakers (current operated)	IEC TC 23
	IEC 60898 Circuit-breakers (overcurrent protection)	IEC TC 23
	IEC 60669 Household switches	IEC TC 23
Important <u>horizontal</u> standards for A&D products	ISO 10303 Product Data Exchange (STEP)	ISO TC 184
	IEC 61000 EMC (Basic Standard)	IEC TC 77
	IEC 61326 EMC for Programmable Systems	IEC TC 65
	IEC 61508 Functional Safety	IEC TC 65
	IEC 60204 Safety of Machinery	IEC TC 44
	IEC 61010 Electrical Safety	IEC TC 66
	IEC 60068 Environmental test	IEC TC 66
	IEC 60721 Environmental conditions	IEC TC 66
IEC 60664 LV Insulation	IEC TC 15	

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BP Engineering Technical Practices - ETP



Guidance	Title
GIS 30-401	Guidance on Industry Standard for Process Automation
GIS 30-411	Guidance on Industry Standard for Data Historian
GIS 30-451	Guidance on Industry Standard for Human Machine I
GP 30-30	Guidance on Practice for Field Communication Buses
GP 30-40	Guidance on Practice for Process Automation Systems
GP 30-41	Guidance on Practice for Data Historian Systems
GP 30-45	Guidance on Practice for Human Machine Interface
GP 30-49	Guidance on Practice for Control System Integration
GP 30-50	Guidance on Practice for Advanced Control (AdCon) A
GP 30-60	Guidance on Practice for Process Control Networks



Saudi Aramco Materials System Specification - SAMSS



Guidance	Title
23-SAMSS-010	Distributed Control Systems
23-SAMSS-020	Supervisory Control and Data Acquisition (SCADA) Systems
23-SAMSS-030	Remote Terminal Unit
23-SAMSS-050	Terminal Management Systems
34-SAMSS-623	Programmable Controller Based ESD Systems
SAER-5895	Alarm Management Guideline for Process Automation Systems



Hydro – Projects Technical Requirements



Requirement	Title
NHT-I52-00049	Safety and Automation Systems (SAS)
NHT-I52-00035	Shut down Hierarchy, General requirements
NHT-X52-00005	Electrical, Instrumentation and Telecomm Installation
10-00-UP-I02-00001	DISCOS/SAS Alarmfilosofi
11-10-NHT-X52-00002	OSF Safety Requirement Specification (SRS)

<http://osl01inet.hydro.com/nht/osl00804.nsf/AllUTSByNumber?OpenView>

Statoil – Technical requirements



Requirement	Title
TR1055	Performance Standards for Safety Systems and Barriers
TR1494	Alarm Philosophy
TR2036	Filosofi og prinsipper for sikkerhetssystemer (Snorre)
TR2135	F&G and ESD System Design Specification (Kristin)
TR2138	Alarm Philosophy (Kristin)
TR2141	SAS Configuration Philosophy - C074-KN-J-FD-0002 (Kristin)
TR2193	Safety Requirement Specification (Visund)

<https://www7.statoil.com/DocMap/page/common/dmpLogin.html>

Standards referred to in company and project standards

- NORSOK I-001 Field Instrumentation
- IEC 61158 Fieldbus for Use in Industrial Control Systems
- ISA 50.02 Part 2 Fieldbus Standard for Use in Industrial Control Systems, Part 2: Physical Layer Specification and Service Definition

- API RP 554 Process Instrumentation and Control
- PSA YA710 (711) Principles for alarm system design
- EEMUA 191 Alarm Systems Philosophy and Guidance
- IFE/HR/F-1158 rev.1 Alarm System Requirements

Standards referred to in company and project standards (cont.)

- NORSOK I-002 Safety and Automation Systems
- ANSI/ISA-84.00.01-2004 Application of Safety Instrumented Systems for the Process Industries
- IEC61508: Functional Safety of Electrical / Electronic / Programmable Electronic Safety Related Systems
- IEC61511: Functional safety instrumented systems for the process industry sector
- OLF 070 - Recommended Guidelines for the application of IEC 61508 and IEC 61511 in the petroleum activities on the Norwegian Continental Shelf
- IEC 61131-3 Programmable controllers - Part 3: Programming languages

Siemens experiences

- UK, Norway and Russia
 - Specifications for new projects from major oil operators are usually adequate and with necessary content
- Middle/North America and some Arabic regions
 - Specifications tend to set the requirements too high
 - Requirements too detailed - the solution becomes impossible, or over-complex
- Specifications are more and more in line world wide
 - Countries or Oil Operators change from old and very detailed specifications to more modern and international requirements
 - Allows state of the art systems to be used

International and National Standards

Requirement	Title
API-RP-14C	Recommended Practice for analysis, design, installation, and testing of basic surface safety systems for offshore production platforms
NFPA72	Fire detection
EN54-2 / EN54-4	Fire detection
IMO SOLAS	Maritime safety system
IMO FSSC	Maritime fire detection
Modu Code	Maritime requirement for drilling rigs
DNV (*)	System requirements for marine applications
	(* DNV requirements or similar ABS requirements)
ATEX	Intrinsic safety / Fire ignition

Requirement	Title
	OD/PTIL requirements
	HSE requirements
	NORSOK
	UKOOA requirements
	ANSI /UL standards

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Need for development

- Initial versions made years ago
- Based on instrumented systems and relay logics
- New revisions does not take new technology into account
- Conservative topology
 - Decreased availability
 - Increased probability of failure on demand

Example – Typical Safety Scenario

Case - Fire Detected

- Fire alarm / PA
- Release of fire fighting
- Close dampers / fire doors
- Shutdown HVAC
- Isolate energy sources carrying energy to the fire area
 - electrical isolation
 - close isolation valves
- Pressure relief

- To follow regulations the function must be split on several controllers. F&G, ESD, Blow-down, and maybe even a separate fire detection unit

Example – Typical Safety Scenario (cont.)

- Combine detection and required actions in one unit
 - Increased availability and reduced PFD
 - Reduced number of controllers
 - Reduced inter-system signals
 - Reduced number of IO
- In total a more simple safety systems
- Less is more!

- A split may be adequate for larger systems, or for units with large numbers of changes on the plant (e.g. F&G systems)

Recommendations

- Safety Systems should be made to serve the actual safety functions the best way
- Safety systems should not be made according to regulations based on limitations in historical technology (split in the safety systems required due to historical designs)
- Harmonized Company Standards would be an advantage
- Standards and requirements should be open for new technology

Recommendations (cont.)

- Too detailed (Example from EN54-2)
 - Requires line monitoring within every 2 min.
 - Demand rate fire loop with one single detector is probably more than 300 years
 - MTBF related to short circuit or open loop is probably also more than 300 years
 - If a loop fault occur the chance for a fire at the same time (demand on the loop) is:
 - For the first hour 1 / 2628000
 - For the first 24 hours 1 / 109500
 - If SIL 2 is required the loop shall fail not more than 1 out of 100 times
 - The 2 min. requirement is more than 3 decades away from the SIL requirement

Recommendations (cont.)

- Good Experiences
 - IEC 61508 Functional Safety - E/E/PE Safety Related Systems
 - Focus on finding the most adequate safety solution (risk based approaches)
 - Does not block good solutions
 - But: Too open, must be used together with other safety systems design requirements
 - DNV requirement for ballast systems
 - Requirements based on application experience
 - Concise and understandable rules

Recommendations (cont.)

Base common standards on:

- EEMUA 191 Alarm Systems Philosophy and Guidance
- IEC 61508 Functional Safety of Electrical / Electronic / Programmable Electronic Safety Related Systems
- IEC 61511 Functional safety instrumented systems for the process industry sector
- IEC 61158 Fieldbus for Use in Industrial Control Systems
- IEC 61131 Programmable controllers

- Already approved and used by many companies

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Thank you!