

SAFETY CONTROL SYSTEMS CONFERENCE 2010

CALGARY, CANADA

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Keynote Speakers
PAUL GRUHN
ICS Triplex
EDWARD MARSZAL
Kenexis Consulting
ISA 84 Experts, ISA Fellows/
Authors & CFSE's

BENEFITS OF ATTENDING:

- Update your knowledge of safety technologies for process and machinery protection
- Learn about the life cycle approach to safety-instrumented systems through case studies and critical discussion
- Find practical solutions to your alarm problems
- See how IEC functional safety standards are being successfully applied to manage safety projects
- Learn about software tools to assist your safety projects
- Network with experienced safety experts and your peers
- See how optimal safety design can improve production and reduce costs

WHO SHOULD ATTEND:

The Safety Control Systems Conference is essential for anyone with a responsibility for the safety of a hazardous process or machinery installation including:

- Electrical and Instrumentation Engineers
- Chemical Engineers and Process Control Specialists
- Process Safety and Loss Prevention Managers
- Plant Managers and Process Supervisors
- Environmental Protection Officers
- Government Safety Regulators/Inspectors
- Production Engineers
- Control System Integrators/DCS Software Engineers
- OHS and Environmental Risk Assessment Specialists
- Technologists & Technicians

CONFERENCE:

12th & 13th May 2010

PRE-CONFERENCE WORKSHOPS:

11th May 2010

1. Everything You Ever Wanted to Know About Safety Systems, and then some
Presented by Paul Gruhn
2. Risk-Based Fire and Gas Detection and Suppression System Assessment
Presented by Edward Marszal

VENUE:

**The Executive Royal Inn,
Calgary**

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INTRODUCTION TO SAFETY CONTROL SYSTEMS

Many industrial processes have the potential to harm people or the environment if something goes badly wrong. Every year, industry experiences catastrophic fires, explosions or toxic releases, but is always striving to avoid such incidents by providing extensive safety measures, often involving the application of automatic safety alarms and high integrity safety control systems.

A 'functional safety system' protects life and business assets through the actions it takes when a hazardous condition is present on a machine or in a process. This may be a safety trip switch on a conveyor or a critical safety alarm on a furnace or it may be a fully automatic shutdown system on a chemical or gas processing plant. However big or small, the safety system must be properly specified and designed for the task that it is required to do.

Safety system practitioners must therefore be aware of the best codes of practice, the best equipment to use and what pitfalls to avoid. Functional safety depends on getting

everything right at all stages of the job, from defining the problem, finding the right solution to ensuring it is always maintained and tested.

This two-day forum with its experienced speakers will highlight and examine the critical issues involved in the application and management of functional safety systems. It will provide opportunities for participants to discuss their experiences and applications, and will cover cost effective and secure solutions to safety problems.

This conference presents an industry-wide forum to examine and discuss the latest international practices and standards in safety control systems. Case studies and practical applications will be presented by specialists experienced in safety life cycle activities such as a hazard and risk assessment and the determination of Safety Integrity Levels (SILs). Topics will be relevant to a wide range of industry sectors including machinery and automation plants, chemical processes, energy and power, pulp and paper and petrochemicals.

Conference Day 1 - 12th May 2010

8.00am	Registration
8.30am	Opening Address Murray Macza - General Manager, ACM Facility Safety
8.45am	SIL Ratings for Fire & Gas Systems - Are We Barking up the Wrong Tree? Session Paul Gruhn - Training Manager, ICS Triplex KEY NOTE 1 Current standards covering fire and gas systems are prescriptive and focused for commercial applications. Many users believe there is a need for performance based standards for such systems used in industrial applications. However, there is considerable debate whether fire & gas systems should have SIL (Safety Integrity Level) ratings at all. Vendors are naturally interested in promoting certified hardware in order to differentiate their products. Yet considering the differences between safety instrumented systems and fire & gas systems, focusing on the performance of the actual fire & gas hardware alone may be a misleading and questionable practice. This paper reviews a) the differences between safety instrumented systems and fire & gas systems, b) how typical voting of fire & gas sensors not only reduces nuisance trips (which is desirable) but also reduces the likelihood of the system meeting the performance target and actually responding to a true demand (which is not desirable), and c) why concepts and standards that apply to safety instrumented systems may not be appropriate for fire & gas systems.
9.45am	The Fundamentals of LOPA and their Practical Implementation Session Peter Scantlebury - Principal Consultant, FSE Global - Canada 2 While Layer of Protection Analysis (LOPA) is becoming the preferred method of SIL assignment, there is considerable variation in its practical implementation. In laying out the fundamentals of LOPA, pitfalls, caveats and limitations in the various practical implementations will be examined. Delegates will learn the fundamentals of LOPA. Building on this the advantages and disadvantages in the various practical implementations will be examined. Armed with this knowledge delegates be able to assess their implementation of LOPA.
10.30am	Morning Break
11.00am	Making the Most of Alarms as a Safety Layer of Protection Session Todd Stauffer - Director - Alarms Management Services, Exida 3 Alarms and operator response are a first layer of protection to prevent a plant upset from escalating into a safety incident. This paper will discuss how to maximize risk reduction of alarms in a layer of protection analysis. Guidance will be drawn from the new ISA-18.2 standard on alarm management. Attendees will learn the following; techniques for optimizing operator performance so the time needed to detect, diagnose, and respond to an alarm is well within the process safety time; considerations for assigning Probability of Failure on Demand (PFD) to the operator's response based on time to respond, testing, training and alarm system performance; how to utilize the information for hazards and risk assessment to support the prioritization and classification of safety alarms during the alarm rationalization stage.
11.45am	A Cookbook of SIS Experiences and Tid-Bits in the execution of the Safety Requirements Specification (There's many a slip 'twixt crouch and leap) Session Simon Lucchini & Stephen Johnson - Chief Controls Specialist & Principal Process Specialist (Risk), Fluor Canada Ltd 4 IEC 61508/61511 clearly calls for an effective Safety Requirement Specification (SRS) to be evolved throughout the life cycle of a Safety Instrumented System. How is the SRS effectively applied and how does the project execution workflow impede or assist its development? Delegates will learn what impedes the development of an SRS and some tools that can be used to mitigate this plus a better understanding of some of the

		mysteries behind reliability data and the application to the real world. Delegates will also gain an understanding of some of the plant operational experiences used in the development of IEC61508/61511.
12.30pm	Lunch	
1.30pm	Users Need Detailed Reliability Analysis Not Just Numbers Session Feng Tao - Project Engineer, Hinz 5 PFD (Probability of Failure on Demand) verification is an important step in safety lifecycle, yet it has not received sufficient attention. Many engineers argue that due to uncertainties in equipment failure data, extra effects spending on reliability calculation are actually waste of time, and they rely on commercial software to simply get reliability numbers, e.g. PFD and STR (Spurious Trip Rate). However, a detailed reliability analysis can provide more knowledge about the safety system. This presentation will attempt to answer why a detailed reliability (PFD) calculation is more preferred than a software generated report containing just numbers. Delegates will learn how simplified equations are derived, what assumptions are underlying and how to apply Markov model method to calculate PFD and STR.	
2.15pm	Fire Detector Coverage Mapping for Improving Existing Systems Session Edward Marszal - Principal Engineer, Kenexis 6 Recent development in the analysis of the performance of fire and gas detection and suppression systems are allowing the quantitative analysis of the coverage provided by arrays of detectors used to protect industrial facilities. These methodologies and the tools that support them were developed as a result of the release of the ISA Technical Report TR 84.00.07 - Guidance on the Evaluation of Fire, Combustible Gas, and Toxic Gas System Effectiveness. This paper presents a case study of the analysis of an existing fire detector system in the Gulf of Mexico. The analysis demonstrated that better coverage could be obtained using fewer detectors, allowing the design to be changed which can result in significantly lowering maintenance costs while improving safety.	
3.00pm	Afternoon Break	
3.30pm	Linking Business Operations with Safety Operations - in Real-Time Session Murray Macza - General Manager, ACM Facility Safety 7 The paper begins by introducing the concepts of business operations management and safety operations management and how modern process plants are wrestling with each. It identifies many of the problems and challenges that chemical and process plant operators face in their highly complex environment. The paper then moves into the domain of Operational Excellence (OE), providing an overview, its history and the principles it offers to address these issues. After providing this context, the paper then offers the reader a practical example of an end-user who has chosen to link real-time business operations with real-time safety operations in their pursuit of Operational Excellence.	
4.15pm	Safety Instrumented Systems: Why Not Take Advantage of SIL-Rated Fire Panels? Session Founignique Coulibaly - Automation Engineer, Alberta Oilsands SAGD Project 8 This presentation will discuss the use of SIL-rated Fire Panels used as part of a SIS system. Firstly a comparison is given of commercial fire panels to SIL-rated fire panels. Secondly, based on a case study, a proposed solution is provided that uses a SIL-rated fire panel as part of the SIS. This is concluded with a comparison of pros and cons. Delegates will hear new ways of applying SIL-rated fire panels in designing Safety Instrumented Systems. A case study will show how based on industry codes and standards, a cost-effective solution can be developed without sacrificing safety.	
5.00pm	Close	

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All conference papers are reviewed and selected for their high quality and technical value by our panel of specialists experienced in the theory and practice of functional safety systems and instrumentation.

Conference Day 2 - 13th May 2010

<p>8.30am</p> <p>Session 9</p> <p>KEY NOTE</p>	<p>Best Practices in SIS Documentation from P&ID through SRS</p> <p>Edward Marszal - Principal Engineer, Kenexis</p> <p>As safety instrumented system design, in accordance with the IEC/ISA 61511 standard matures, best practices are evolving based on end users preferences, economy of presentation, ease of use for subsequent tasks, and lessons learned from unsuccessful early attempts. Items like P&ID representation of safety functionality are still inconsistent across industry, and in some cases the results of poor documentation are excessive effort required in subsequent engineering and maintenance phases along with incomplete or improper designs. This paper collects industry experience and presents best practices for documentation and presents the rationale for the choices made. Items such as P&ID representations, grouping of the functionality of multiple loops, and formatting for logic descriptions and test plans will be discussed and examples provided.</p>	<p>1.15pm</p> <p>Session 13</p> <p>Things to Consider when Selecting a Safety Instrumented System</p> <p>Paul Gruhn - Training Manager, ICS Triplex</p> <p>Just as each project is different, the question of what is the most appropriate safety system may differ for each project as well. Vendors often promote what they believe to be their unique differentiators and why they believe their systems to be the best. Unfortunately, what a vendor perceives as an important feature may not always have an associated real benefit in the mind of the user. All you really need is what's suitable for your application, at a price you're willing to pay, from someone you trust. As with most things in life, when there are few choices available, selecting between them is relatively simple. However, when the number of available selections is large, and they all differ from each other in a myriad of ways, choosing between them can seem overwhelming. This presentation offers a scoring system based on evaluating three dozen different criteria, including the company, the hardware, and the software.</p>
<p>9.30am</p> <p>Session 10</p>	<p>Comparison of Safety Categories, Performance Levels and SILs for Machine Safety Control Systems</p> <p>Raj Sohal - Industrial Safety Controls Specialist, Stantec Consulting Ltd. Paul Brzustowski - Team Lead - Industrial Safety Engineering, Stantec Consulting Ltd.</p> <p>The release of IEC 62061 in 2005 and the revised ISO 13849-1 in 2006 have presented the safety control system designer with new sets of tools that can be used to reduce the risk of worker exposure to machine hazards. This paper will demonstrate the application of risk assessment to a typical industrial machine guarding scenario. IEC 62061 will be used to determine the required Safety Integrity Level (SIL) necessary to achieve suitable levels of risk reduction. In parallel, ISO 13849-1 will be used to determine the required Performance Level (PL) for the same machine guarding scenario, and to identify the permitted combinations of Category Level, Diagnostic Coverage and Mean Time to Dangerous Failure needed to achieve compliance. The two methods will be compared and contrasted, even as both standards are shown to work toward the same goal of minimizing the probability of dangerous failure of the machine safety control system.</p>	<p>2.00pm</p> <p>Session 14</p> <p>IEC 61511 for the Design of Burner Management and Combustion Control Systems</p> <p>Sean Carron - Engineering Manager, Combustion Solutions Inc.</p> <p>The design of burner management and combustion controls systems presents unique challenges. This paper explores the different techniques available for solving common BMS and Combustion Control Problems. The paper compares North American codes with IEC 61511 standards. The paper addresses BMS configurations, typical valve and sensor layouts, available options and field experiences.</p>
<p>10.15am</p>	<p>Morning Break</p>	<p>2.45pm</p> <p>Afternoon Break</p>
<p>10.45am</p> <p>Session 11</p> <p>CASE STUDY</p>	<p>Application of SIL principles where the potential for conflict exists for the Functional Safety Engineer</p> <p>Blair Robichaud - Automation Project Lead, SNC-Lavalin Inc.</p> <p>This paper will discuss practical examples of the application of SIL principles where the potential for conflict exists for the Functional Safety Engineer in applying protection layers as per quantitative methods including LOPA to restrict the design of the SIS to only include justifiable functionality. Delegates will be given examples where the Functional Safety Engineer may face challenges in applying inherent safety concepts and proper SIL determination methods to large-scale projects. A few examples are given to illustrate this; Upholding the principles of inherently safe design in the face of project pressure to reduce capital costs; SIS design that contains only functions with justifiable SIL requirements in the face of established and "rule of thumb" practices that include too much functionality in the SIS.</p>	<p>3.15pm</p> <p>Session 15</p> <p>Functional Safety Management Systems for Compliant and Efficient Implementation of Safety Instrumented Systems</p> <p>Edgar C. Ramirez - Safety Systems Business Driver, ABB Inc.</p> <p>To deal efficiently with requirements of safety standards, a Functional Safety Management framework comprising organization, resources, planning and implementation of activities should be in place. This is required for safety instrumented systems to place and maintain processes in a safe state. This presentation will show how the use of a Functional Safety Management System allows integrators and users of Safety Instrumented Systems to be confident that they will fulfil requirements of safety standards.</p>
<p>11.30am</p> <p>Session 12</p>	<p>A Carrot-or-Stick Approach to the Economics of Safety</p> <p>Stejarel Achimescu-Gulian - Senior Automation Engineer, Worley Parsons Canada</p> <p>When it comes to safety, while the questions of 'why', 'what', 'how' and 'when' are fairly well addressed by standards or at least by best engineering practices, the question of 'how much' organizations need or are willing to spend to compliantly implement and maintain safety is answered with more or less accuracy only during the initial phases/gates of a project through the budgeting exercise. More often than not, and especially in the case of very large projects developed across many years, crucial safety life-cycle activities end up finding themselves strapped for resources. This paper looks at the typical gaps as seen by the authors practical experience and the possible ways to avoid budget items falling through the cracks.</p>	<p>4.00pm</p> <p>Session 16</p> <p>Better Good Than Lucky: Choosing a Personnel Functional Safety Certification Program</p> <p>Sam Kozma - Managing Director, Exida Canada Ltd</p> <p>Safety accidents reinforce the need for competent safety practitioners as noted in the IEC 61508 and 61511 functional safety standards. This presentation will review the requirements for having trained, experienced and competent personnel and will discuss the certification programs in place. Attendees will learn the following: o Why personnel safety certification programs are needed o The similarities and differences between safety certification of personnel vs. automation equipment o The benefits that certification provides to companies and individuals o The key characteristics that differentiate the current personnel safety certification programs that exist today. o Major trends that are causing safety certification programs to evolve (such as the effect of cyber security on the operation of a safety system) and how to prepare for the future.</p>
<p>12.15pm</p>	<p>Lunch</p>	<p>4.45pm</p> <p>Closing</p> <p>NETWORKING SESSION</p> <p>Cocktail Hour - 5.00pm to 6.00pm</p> <p>For all attendees to meet and socialise with experts and industry peers at the Safety Control Systems Conference Cocktail Hour.</p>



