FSES FUNCTIONAL SAFETY ENGINEERING SERVICES

SAFETY SYSTEMS, ENGINEERING & SERVICES

Lunch & Learn Sessions

Presented by Functional Safety Engineering Services

Introduction

Our Story

Our Story

Functional Safety Enginereing Services Ltd. (FSES) was established in response to the much needed conformance to the international standards IEC 61508 for Electrical/Electronic and Programmable Electronic Safety Related Systems and its derivatives IEC 61511, IEC 61513, IEC 61505 etc.

Our mission has always been to be the number one global functional safety consultancy, delivering services to various industries where compliance is required.

We have come a long way since our establishment, delivering large Quantitative Risk Assessments in Saudi Arabia, Process Hazard Assessment workshops in various countries in the Middle East and technical consultancy services globally.

With experience gained working with (and as) end users, Engineering Procurement and Construction (EPC) companies and system integrators. FSCL has the underpinning knowledge of Functional Safety standards and has gained significant experience in its application; subsequently we are competent in providing practical solutions that emphasis the application of appropriate level of rigour.

Our solutions and services are tried and tested, implemented by major operators in the process industry and accepted by regulating bodies including the Health and Safety Executive (HSE).

FSES FUNCTIONAL SAFETY ENGINEERING SERVICES

SAFETY SYSTEMS, ENGINEERING & SERVICES

"The Safe Way Is the Best Way"

Who We Are

Who are We & Why Us?

Functional Safety Engineering Services are an engineering consultancy company built on experience and expertise in the field of functional safety.

Our consultants are able to support clients in the functional safety aspects of the processes, systems and equipment for the oil and gas, petrochemical, utilities (including green technologies), military and manufacturing industries.

- TÜV Functional Safety Engineers
- Quality focused through ISO 9001 Management Systems
- Functional Safety Management Experts
- Globally Established Consultants

Meet our Team

Peter Hall
Managing Director

Martin Snow
Commercial Director

Amir Akhlaghi
Engineering Director

Mohammed Bhaimia
Senior Consultant

Lunch and Learn Topics

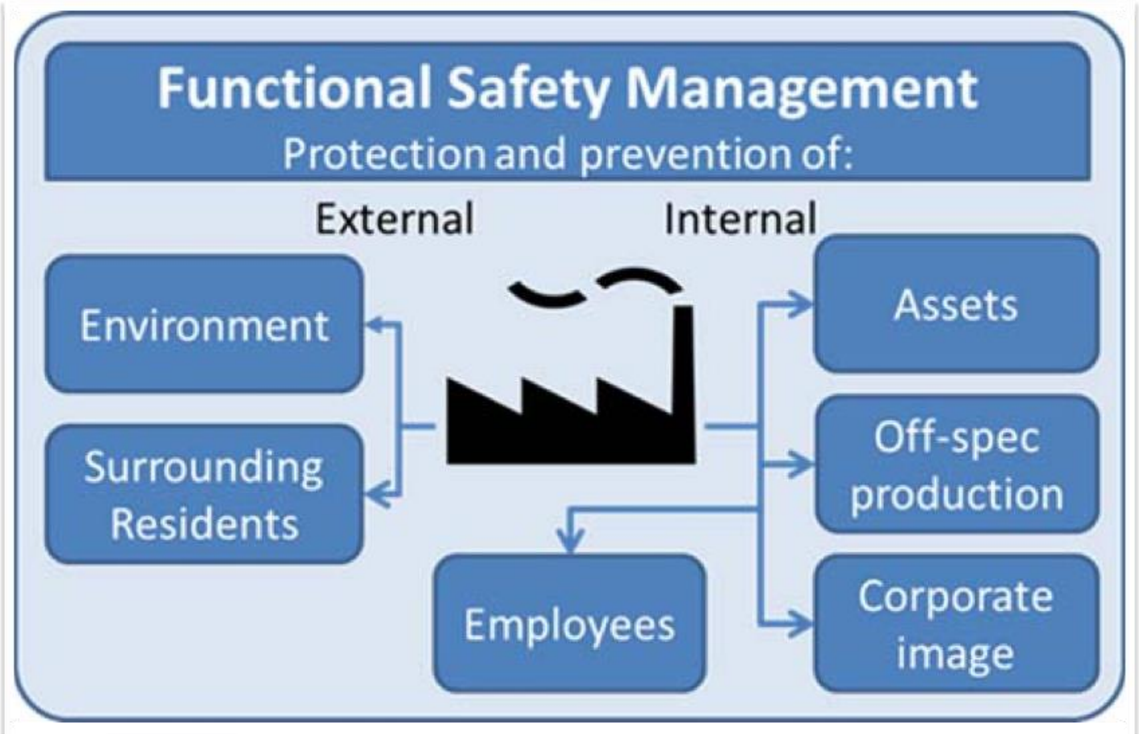
What can we offer

Introduction To Functional Safety, IEC 61508 and IEC 61511

Lunch and Lean Session 1

This introduction provides an overview of the International Standards for provision of Functional Safety Services IEC 61508 (the mother standard) and thus its process industry derivate IEC 61511. The challenges faced in following the frame work are considered and presented. The concept of Safety Life Cycle and the requirements for Management of Functional Safety, minimisation of Random Hardware Failures and minimal Architectural requirements for Safety Systems are covered. Key points:

- What is Functional Safety
- Safety Life Cycle
- E/E/PE Safety Related Systems
- Risk Assessment Based approach provision of safe guards and protection layers.
- What is SIS, What are SIFs



FSM FUNCTIONAL SAFETY MANAGEMENT IEC 61508:2010

SIL CERTIFIED FUNCTIONAL SAFETY ENGINEERING AS61508 AS61511

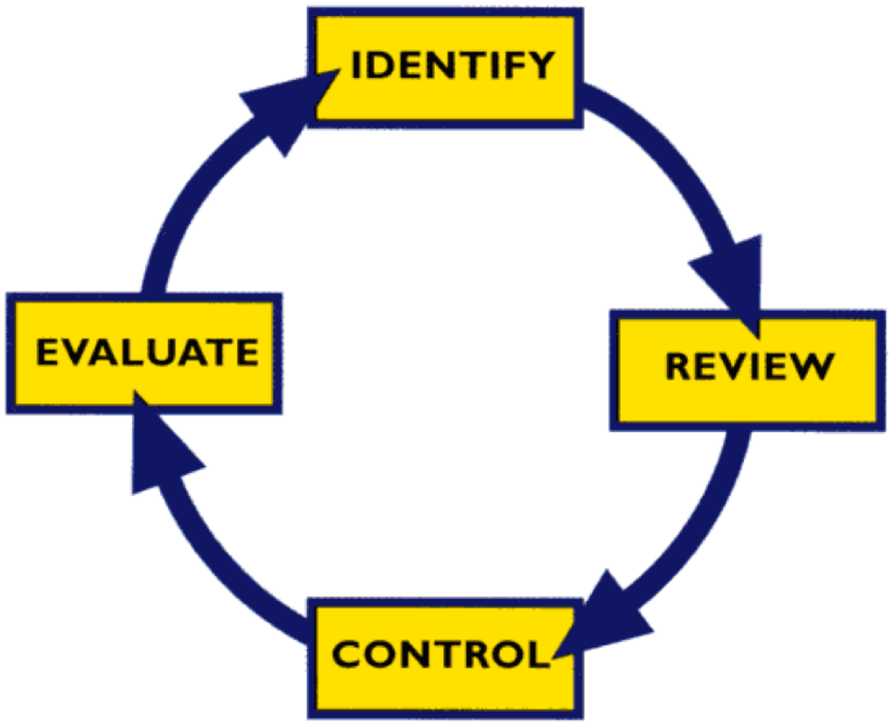
Risk Assessment Techniques and Selection

Lunch and Lean Session 2

This session concentrated on the 3 main type of Risk Assessment:

- Qualitative Risk Assessment
- Semi-Quantitative Risk Assessment
- Quantitative Risk Assessment

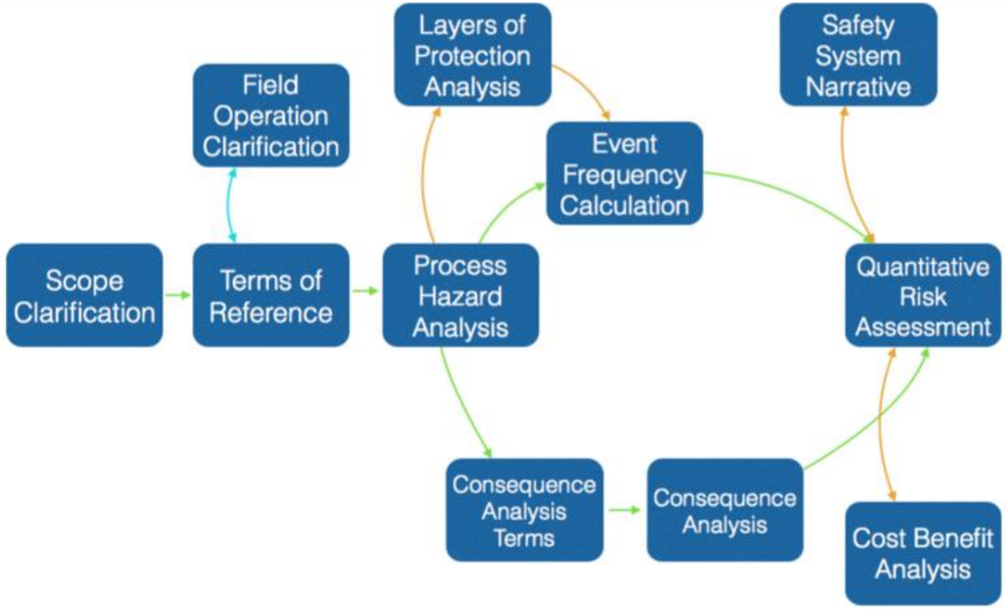
How does one go about selecting the appropriate Risk Assessment tool for the project in hand. How is the current phase of the project (i.e concept, Pre FEED, FEED or Detailed Design) effect the selection of the assessment type. The session also provides details of where these types of risk assessments are called upon to address specific phases of the IEC 61511 Safety Life Cycle.



Introduction to Quantitative Risk Assessment (QRA)

Lunch and Lean Session 3

This session looks how an appropriate QRA life cycle maybe complied for a complex facility or complex process hazards. What are the required steps in fully quantifying risk in terms of Individual Risk Per Annum (IRPA) and Potential Loss of Life (PLL). How can a QRA life cycle be customised to meeting the financial requirements of project in terms of Life Cycle Cost Analysis.

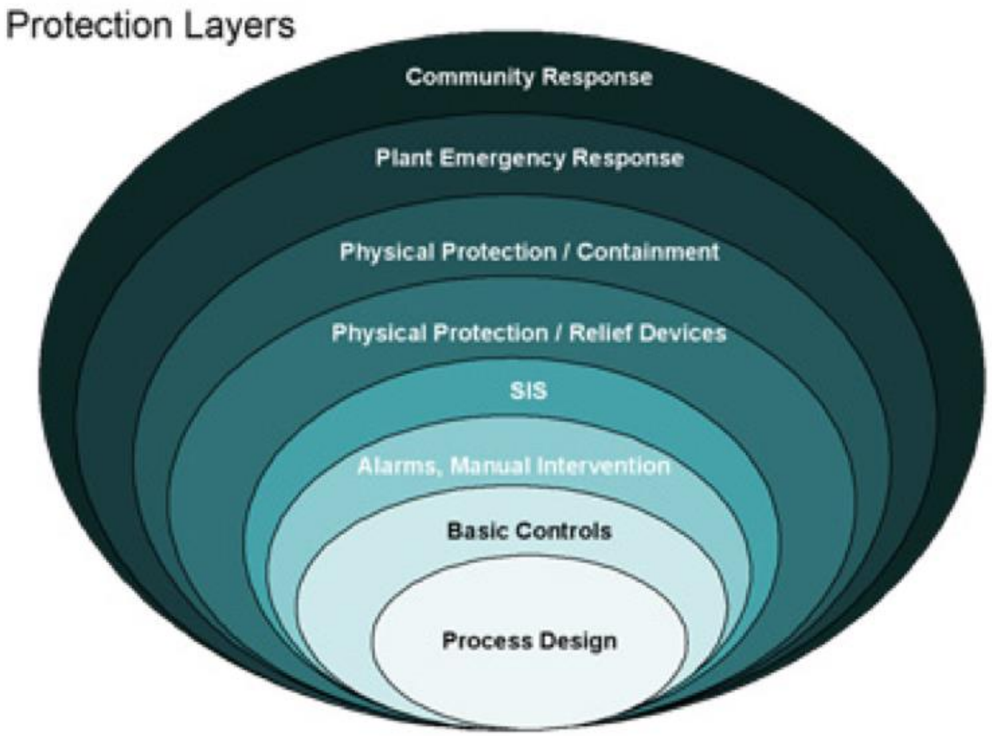


Layer of Protection Analysis as a Semi Quantitative Risk Assessment Tool

Lunch and Lean Session 4

The use of LOPA methodology and techniques in order to address the requirements of IEC 61511 Phase 2, Allocation of Safety Functions To Protection Layers. Calculating intermediate event frequencies for individual scenarios or multiple scenarios. Tolerable risk criteria and selection of appropriate risk targets.
LOPA rule set, what are enabling conditions, Conditional Modifiers, and Independent Protection Layers.

The common mistakes made in LOPA, commonality between imitating causes and credited safe guards or excessive use of conditional modifiers.

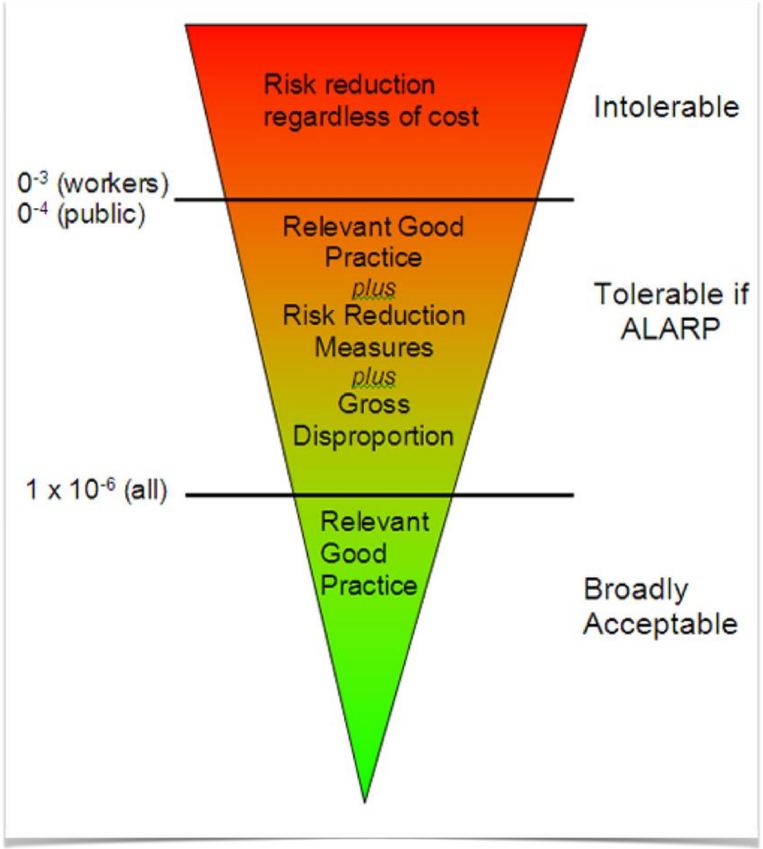


As Low As Reasonably Practicable (ALARP)

Lunch and Lean Session 5

ALARP stands for "as low as reasonably practicable", and is a term often used in the milieu of safety-critical and safety-involved systems. The ALARP principle is that the residual risk shall be as low as reasonably practicable. Demonstration of ALARP and cost benefit analysis. Calculation of justified cost.

Do we need to do more, if so how? if not why?



Safety Integrity Level (SIL) Calculations

Lunch and Lean Session 5

Tools and techniques used for calculation of Probability of Failure On demand (PFD) and Failure Rate (PFH). Reference to IEC 61508 Part 6 and the simplified formula. The provenance of the simplified formula and it's limitations.

Voting configurations and the effect of imperfect proof testing on SIFs.

Safety Integrity Level	Probability of Failure on Demand	Risk Reduction Factor
SIL 4	>= 10^{-5} to < 10^{-4}	100,000 to 10,000
SIL 3	>= 10^{-4} to < 10^{-3}	10,000 to 1,000
SIL 2	>= 10^{-3} to < 10^{-2}	1,000 to 100
SIL 1	>= 10^{-2} to < 10^{-1}	100 to 10

Imperfect Proof Testing

Lunch and Lean Session 5

The long term effect of imperfect proof testing. Can imperfect proof testing be accounted for in SIL verification activities. What can and should be done to minimise Imperfect Proof Testing. What is the IEC 61508 and IEC 61511 views on imperfect proof testing for LOW Demand and HIGH Demand SIFs.

Get in touch

We want to hear from you

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