

Technical Process Safety Seminar Singapore

Applying Functional Safety and Reaction Safety for Safety Cases

19 August 2019

Devan Nair Institute of Employment and Employability



Organised by:

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A * S T A R

Institute of
Chemical and
Engineering Sciences

Welcome Remarks



Mr Yong Wui Poh CEng FICHEM
Chairman - IChemE in Singapore

As you are aware, the IChemE in Singapore has been working closely with the government agencies and industry to support and enhance the awareness of benefits of process safety through a series of seminars, leadership forums and workshops over many years.

We have seen significant developments in an enhanced process safety framework. Based on the feedback by the companies and the regulators in their journey to a safety case for Major Hazard Installations, we understand the need as a learned society, to fill some knowledge gaps, especially in regards to Applied Functional Safety and Applied Reaction Safety.

In the first of our series of Technical Process Safety Seminars, we have prepared an educational, informative structured programme with leading professionals to share their experience to allow you a smoother journey to delivering your Safety Case to the various stakeholders.

You will also be able to hear directly from the regulators on their findings at this critical juncture of the Safety Case Implementation. We are complimenting this with in-depth afternoon sessions to help you and your organisation meet the expectations on applying the technical guidance for your operations building on the current requirements, especially with regards to Applied Functional Safety and Applied Reaction Safety.

I would welcome you all to join us at this IChemE Technical Process Safety Seminar 2019 in Singapore and to wish everyone a safe and educational experience to assist Singapore and the region in enjoying a safe and sustainable future.

Technical Process Safety Seminar Singapore

Applying Functional Safety and Reaction Safety for Safety Case

Date Monday, 19 August 2019

Time 09:00 to 17:00
(registration starts at 08:30)

Venue Devan Nair Institute of Employment and Employability
80 Jurong East Street 21, Singapore 609607

Fees IChemE Members, A-Star Staff, New RIIS Staffs - **S\$130.00**
Members from supporting organisation - **S\$160.00**
Non-members - **S\$200.00**

[Click here to register](#)

For enquiry, please contact us at singaporemembers@icheme.org

Please note: This seminar has been approved for 6 Professional Development Units and 5 Safety Development Units.

Programme Outline

Monday 19 August 2019

Time	Title & Speaker	
SESSION 1 Hall 1, Level 1		
08:55 - 09:00	Opening Address Brother Karthikeyan Vice President NTUC Central Committee & Chairman of NTUC OPEC cluster	
09:00 - 09:30	Safety Case Implementation in Singapore Er Go Heng Huat	
09:30 - 09:50	Safety-I and Safety-II with Digital Transformation Mr Jonas Berge	
09:50 - 10:10	Professional Recognition of Process Safety Mr David Lloyd-Roach	
10:10 - 10:40	Panel discussion with speakers Chaired by Dr Paul Sharratt	
10:40 - 11:00	Tea Break	
SESSION 2 Hall 1, Level 1		
11:00 - 11:30	Layers of Protection Analysis (LOPA) Er Srinivas Premkumar	
11:30 - 12:00	Functional Safety and Safety Integrity Level (SIL) Mr Aravindhnan Ramasamy	
12:00 - 12:30	Chemical Reaction Safety Dr Paul Sharratt	
12:30 - 13:30	Lunch	
Breakout Sessions	Session 1: Hall 1	Session 2: NEWRIIS RM
13:30 - 15:00	Layers of Protection Analysis Workshop Mr Srinivas Premkumar	Chemical Reaction Safety Workshop Dr Shaik Salim / Dr Paul Sharratt
15:00 - 15:30	Tea Break	
15:30 - 17:00	Functional Safety / Safety Integrity Level Workshop Mr Aravindhnan Ramasamy	Chemical Reaction Safety Workshop Dr Shaik Salim / Dr Paul Sharratt
17:00	End of Programme	

Keynote Speakers



Er Go Heng Huat

Director of the Major Hazards Department of the Ministry of Manpower

Updates on Safety Case Implementation

In September 2017, Major Hazard Installations (MHIs) in Singapore began to embark on the Safety Case Regime. MHIs, through their Safety Cases, are required to identify major accident hazards in their installations and demonstrate that their risks have been reduced to as low as reasonably practicable (ALARP). He will share the approach adopted by regulators in Safety Case assessments. He will also touch on common lapses observed in Safety Cases assessments and the enhancements to the support framework for Safety Case implementation.

Biography: Er Go Heng Huat oversees the regulation of the Safety Case regime for major hazard installations in Singapore. He is a registered Professional Engineer (Chemical) with the Professional Engineers Board Singapore. He is actively involved in national standardisation in Singapore. He is a member of the Singapore Standards Council and chairs the Quality and Safety Standards Committee. He also sits in various committees of government agencies, including the EDB's Process Construction and Maintenance Management Committee. He is an Adjunct Associate Professor with the Department of Chemical and Biomolecular Engineering of the National University of Singapore.



Mr Jonas Berge

Senior Director
Emerson Automation Solutions

Safety-I and Safety-II with Digital Transformation

Digital transformation of how the plant is run and maintained is already used as a new solution in many plants to avoid errors and incidents, but also to assist in success under varying conditions. New digital work processes around new tools and situational awareness like proactive location awareness, worker rest management, manual valve operations support, Virtual Reality (VR) learning, piping and vessel integrity, and reducing fieldwork thus making it easier to get it right even when circumstances are changing. This is achieved with the same Digital Operational Infrastructure (DOI) used to improve reliability, energy efficiency, and production.

Biography: Jonas Berge was educated in Sweden and is a Senior Director at Emerson Automation Solutions in Singapore. He is responsible for helping plants and EPCs to adopt new technologies moving the industry forward with digital transformation. He has over thirty years of experience in the field of instrumentation and controls. Mr. Berge is a Subject Matter Expert (SME) in the field of Digital Transformation (DX) including fieldbus, wireless, and the Industrial Internet of Things (IIoT). Mr. Berge is a senior member of ISA, participating in the ISA104 and ISA108 standards committees and sits on the Steering Committee of the Field Comm Group in Asia Pacific. Mr. Berge is the author of the books "Fieldbuses for process control: Engineering, Operation, and Maintenance" and "Software for Automation: Architecture, Integration, and Security" and has contributed to several other books and is frequently featured in articles. He is the editor for the ANSI/ISA/IEC/TR 61804-6 standard. Holds patents in safety communications. Occasionally act as adjunct lecturer.



Dr Shaik M. Salim

Principal Specialist, Team Leader - Safety & Sustainability
Institute of Chemical Engineering Sciences

Chemical Reaction Safety

Biography: Dr Salim has more than 20 years' experience in safety both in the public and private sectors. He is currently leading the Safety and Sustainability team within Institute of Chemical and Engineering Sciences (ICES) with an emphasis on Process Safety, Life-Cycle-Assessment and Process Systems optimisation. His main research interests include process hazard assessment methodologies, dust explosion studies, runaway reaction detection, inherent safety for intensified processes, hybrid LCA-Safety methodologies, risk perception and reliability of complex systems. He is an active contributor in the development of several national safety standards in Singapore. He is also currently an Adjunct Lecturer in Process Safety for Singapore Institute of Technology's chemical engineering degree programme and Newcastle University's MSc programme while also being a Professional Engineer (Chemical) registered in Singapore.



Er Srinivasan Premkumar

Director & Chief Process Safety Specialist
ALARP Process Safety Solutions

Layers of Protection Analysis (LOPA) Interactive Workshop

Layers of Protection Analysis (LOPA) is a semi-quantitative risk assessment tool that is commonly used across the globe for analysing and assessing the risks of the major accident scenarios. It uses an order of magnitude technique to evaluate the adequacy of the existing layers of protection (i.e. control measures) against the risk tolerance criteria. The result of the LOPA is typically used as one of the inputs for the ALARP demonstration. The fundamentals, methodology and application of the LOPA will be discussed in the morning to give an introduction and set the stage for the afternoon workshop. In addition, the pitfalls and limitations of the LOPA will also be discussed. During the afternoon session, a worked-out LOPA example will be shared for the discussion followed by a LOPA workshop. The participants themselves will be completing a LOPA for a given major accident scenario to get the hands-on application experience.

Biography: Premkumar is a process safety specialist with hands on industry experience in process safety, process design, process engineering and plant operations. He is a chemical engineer with 22 years of process industry experience in petroleum refining, petrochemicals, chemicals, oil & gas and industrial gases sectors across Asia Pacific, New Zealand and India. He is an IChemE Professional Process Safety Engineer and a Professional Engineer (Chemical) registered in Singapore. He has a well-rounded international experience in the operating, engineering and consulting environments. Prior to his current role, Premkumar worked for the multinational companies including ExxonMobil, Chevron, Air Products, Jacobs Engineering and WorleyParsons. He handled a regional process safety specialist role and provided process safety and risk engineering support to the existing operating facilities and capital projects (up to US\$700MM) across Asia Pacific region. He chaired several workshops on HAZID, HAZOP, SIL determination, Bowtie reviews, LOPA and ALARP demonstration. He led and successfully completed specialised process safety studies including Occupied Building Risk Assessments (OBRA's), overpressure protection studies and fire safety studies. He assisted major hazard installations in New Zealand and Singapore in their Safety Case development. He is an accomplished trainer for the process safety and risk training courses.



Mr David Lloyd-Roach

Director of Qualifications
Institute of Chemical Engineers

Professional Recognition of Process Safety

Biography : David joined IChemE in August 2017 to provide interim cover as Director of Qualifications. David has previously fulfilled the role of Director of Membership at the Institution of Civil Engineers. David is a mechanical engineering graduate and has served 20 years in the Royal Air Force as an Aerosystems Engineer Officer. He holds a masters degree in explosives ordnance engineering and specialised in weapons systems and explosive ordnance disposal. On leaving the RAF, he spent 4 years working in the IT sector in operations management and business development. He joined the Institution of Civil Engineers in late 2002, and over 12 years at ICE was responsible for membership, qualifications, international and UK operations, and marketing. David is an Honorary Fellow of the Society of the Environment and currently chairs its Registration Authority.



Dr Paul Sharratt

Principal Scientist
Institute of Chemical and Engineering Sciences

Chemical Reaction Hazards – Learning from the Past to avoid a Disaster

Many of the most famous disasters in the history of the chemical industry have involved loss of control of reacting systems. Typical root causes include lack of understanding of the reacting system, failure to design and implement appropriate control measures and failure to operate any controls effectively. This talk will describe some examples – both of famous incidents and from accidents in Singapore – and trace back to the root causes. By knowing what went wrong in the past we can hopefully avoid disaster in the future.

Biography: Dr Paul Sharratt started his chemical engineering career at ICI, working in process development and projects. His contacts with the ICI Hazards Group generated an interest in Process Safety which was carried on through research and teaching in UMIST / the University of Manchester and in the last 10 years in Singapore at A*Star. He has taught safety material at undergraduate and postgraduate level including in the Newcastle Masters course in Singapore as well as short courses in China, Mexico and Peru. He has consulted on a range of safety-related projects and contributed to a UK-produced documentary on Bhopal.



Mr Aravindhan Ramasamy

Director & SIS/Automation Technical Specialist
CIS Automation Pte. Ltd., Singapore

Functional Safety and Safety Integrity Level (SIL)

The presentation will cover basics of Safety Integrity Level of Safety Instrumented System (SIS). It will talk about pitfalls to avoid while determining the need for SIL. Different methods to determine SIL will be briefly covered. Then it will talk about SIS lifecycle – identifying scenarios, determining SIL, inspecting and maintaining the SIL. It will also touch on soft side of maintaining SIL – which is based on mindset and behaviour of people maintaining it.

Biography: Aravindhan has over 21 years of experience in Control, Instrumentation and Safety Instrumented System (SIS) including 12 years of SIS specific services in oil & gas, petrochemical and chemical industries. He has been involving in numerous energy domain related projects as a diverse role player including system integrator, main automation contractor, engineering design consultant, functional safety lead and more. His core competency includes SIF/SIL Assessment, defining Safety Requirements Specifications (SRS), SIF/SIL Verification, SIF/SIL Validation, Functional Safety Assessment (FSA) & Auditing in compliance with IEC 61508 / 61511. His SIS specific carrier achievement includes Certified Functional Safety Expert (CFSE) and Fire & Gas Practitioner (FGP) and thus serving for process industries in compliance with international/national standards/regulation with confident. His SIS specific carrier experience & consulting services in Singapore includes Yokogawa, KBR, Samsung C&T, HIMA and TÜV Rheinland.

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ISC interactive case studies

IChemE Safety Centre's essential training resources provide a rare opportunity to experience a series of process safety incidents as they unfold, in a real-time setting, without any prior knowledge of the outcome. Throughout the training session users will make crucial safety decisions, and discover how each of their decisions influences the incident.

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IChemE Forthcoming Training/Events 2019

Training Courses

HAZOP Study for Team Member & Team Leader

25-27 June

www.icheme.org/hazop-team-malaysia

Layer of Protection Analysis (LOPA)

19-20 August

www.icheme.org/lopa-malaysia

Fundamentals of Process Safety

25-29 November

www.icheme.org/process-safety-malaysia

Events

Hazards Asia Pacific 2019

24-25 September

www.hazardsap.org

Hazards Australasia 2019

13-14 November

www.icheme.org/hazardsaus2019

Chemeca 2019

29 September - 2 October

www.chemeca2019.org

In-Company Training

What we offer

IChemE provides products and services tailored to support the career-long development of chemical, biochemical, process and related engineering professionals. We constantly strive to meet industry needs and all our courses reflect this.

We offer a comprehensive programme of courses all of which are presented, approved and reviewed by IChemE industry peers to ensure both quality and competency. If you have a team of people to train, an in-company course is ideal. Our vast access to industry knowledge makes us the clear choice to help you deliver your training requirements to your team. We will run the course of your choice at a date and location to suit you.

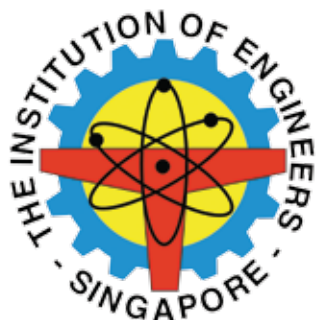
Benefits

- tailor-made programmes ensuring the course addresses your operational processes and includes organisation-specific case studies, if required.
- cost-effective - saves time and money on travel and accommodation.
- more control over what your team learns.
- delegates work together at a convenient date and location which leads to enhanced teamwork and motivation.

Request a quotation

If you would like further information about running an IChemE in-company course, fill in a quick online form with the necessary details for us to contact you with a quotation. If you are unable to complete the form, please email your requirements to courses@icheme.org.

Supporting Organisations



Hazards AsiaPacific2019

The 5th Hazards Asia Pacific Symposium

24-25 September 2019,
Kuala Lumpur, Malaysia

Culture, Technology and Responsibility



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