SYSTEM SAFETY SOCIETY

Organized 1962
Incorporated 1973

Professionals Dedicated to the Safety of Systems, Products & Services

System Safety Society, Singapore Chapter
http://www.systemsafety.org.sg/

System Safety Analysis Techniques Course

- 2nd to 4th August 2010, 9.00am – 5.00pm

Course Outline – See Attached Brochure

Course Details

Course Venue: (Location to be determined)

Course Fee	
System Safety Society or Singapore Chapter Affiliate / Member	**Others**
S$ 1,100	**S$ 1,150**

For more information, please contact:

- Ms Eileen Seah via email: ***admin@systemsafety.org.sg***

REGISTRATION FORM		
Organisation Name:		
Address:		
Contact Person (for payment):	Mr / Ms.	
Fax:	Telephone:	
Email:		
Participants Details		
Name: Mr / Ms.		Contact No.:
Designation:		Meals Restriction:
Email:		Nil / Vegetarian / Halal
Name: Mr / Ms.		Contact No.:
Designation:		Meals Restriction:
Email:		Nil / Vegetarian / Halal
Name: Mr / Ms.		Contact No.:
Designation:		Meals Restriction:
Email:		Nil / Vegetarian / Halal
Name: Mr / Ms.		Contact No.:
Designation:		Meals Restriction:
Email:		Nil / Vegetarian / Halal
Name: Mr / Ms.		Contact No.:
Designation:		Meals Restriction:
Email:		Nil / Vegetarian / Halal
Name: Mr / Ms.		Contact No.:
Designation:		Meals Restriction:
Email:		Nil / Vegetarian / Halal
Name: Mr / Ms.		Contact No.:
Designation:		Meals Restriction:
Email:		Nil / Vegetarian / Halal
Name: Mr / Ms.		Contact No.:
Designation:		Meals Restriction:
Email:		Nil / Vegetarian / Halal

***** Please delete wherever appropriate***. Course capacity is 20 participants.***

ADMINSTRATIVE DETAILS

Registration should be done via **email only**. Please fill in the registration form, scan and email to ***admin@systemsafety.org.sg***.

For payment, please indicate the **invoice number**, **organisation name** and **contact person** at the back of the cheque. Cheques should be **made payable to "System Safety Society (Singapore Chapter)"** and mail to:

System Safety Society (Singapore Chapter)
(c/o Quality & Safety)
Singapore Technologies Kinetics Ltd
249 Jalan Boon Lay
Singapore 619523

Confirmation will be sent to the participants within 3 days before the commencement of the course. No refunds will be granted for cancellation; however a replacement is acceptable. The System Safety Society (Singapore Chapter) reserves the right to cancel, modify or postpone the course.

The Singapore Chapter of the System Safety Society
(in cooperation with the University of Cincinnati)
Invites You to Attend

"SYSTEM SAFETY ANALYSIS TECHNIQUES FOR ENGINEERS, MANAGERS, AND OCCUPATIONAL SAFETY AND HEALTH PROFESSIONALS"

to be presented at

(Location to be determined)
on 02-04 August 2010, Monday - Wednesday
Starting at 0900 and ending at 1700

The course will be taught by:

Prof. Rodney J. Simmons, Ph.D., CSP
Visiting Professor of Industrial Management
National Taiwan University of Science and Technology

formerly
Visiting Professor of Safety Engineering
Hong Kong Polytechnic University (2008-2010)
Visiting Associate Professor of Safety Engineering
Tunghai University, Taiwan, (2008-2009)
Associate Professor and Safety Program Director
Illinois State University (2001-2008)
Adjunct Associate Professor of Industrial Engineering
University of Cincinnati (1986-2007)

Course participants will earn 2.1 Continuing Education Units, issued by the University of Cincinnati's Office of Medical, Occupational Health and Safety Continuing Education

---

COURSE OBJECTIVES — To make participants proficient in the use of uncomplicated — but proven and effective— techniques in process/system safety/risk management and engineering. The course will provide the methodology to implement and conduct a process/system safety program concurrent with other assurance disciplines to enhance employee safety, environmental protection, process efficiency, and product quality.

WHO SHOULD ATTEND — Managers, Engineers, System/Occupational Safety Engineers, Industrial Hygienists and Environmental Professionals.

REQUIRED BACKGROUND FOR COURSE PARTICIPANTS — Attendees should possess an understanding of risk, the risk assessment matrix, and calibration of the matrix. This background can be obtained in a one-day course.

HOW DOES THE ATTENDEE BENEFIT? — Attendees develop skills to recognize/identify hazards and assess risks posed by those hazards using practical, uncomplicated techniques drawn from the realm of System Safety practice. Methods are learned for determining limits within which risk should be considered acceptable, and for using limited resources to control risk within those limits of acceptability. Workshop problem sessions sharpen competence with the newly acquired analytical skills, leaving the participant capable of using the techniques in practical work settings.

System Safety Analysis Techniques for Engineers, Managers, and Occupational Safety and Health Professionals

Prof. Rodney J. Simmons, Ph.D., CSP

About the Instructor

Dr. Simmons is currently Visiting Professor of Industrial Management at National Taiwan University of Science and Technology. During 2008-2010, he served as Visiting Professor of Safety Engineering at The Hong Kong Polytechnic University, was also Visiting Associate Professor of Safety Engineering (2008-2009) at Tunghai University (Taiwan). At all institutions, he is teaching or has taught MS/PhD courses in system safety and risk management and leading safety engineering curriculum development efforts. During 2001-2008, he was Associate Professor at Illinois State University (ISU), and served as Program Director for ISU's safety degree program. During 1997-2007 he was also an Adjunct Associate Professor of Industrial Engineering at the University of Cincinnati. He was a full-time engineering faculty member at University of Cincinnati from January 1986 through December 1996, and has also served on the engineering faculty at Texas A&M University. He has taught risk management and process safety courses at Kuwait Institute of Scientific Research since 1997, and has also taught risk analysis for the Naval Surface Warfare Center (2007) and the Naval Undersea Warfare Center as a U.S. Navy Summer Faculty Fellow (1995). During 1997-2001, he was Technical Director for the Board of Certified Safety Professionals, the leading peer-operated certification organization in the United States. His consulting clients include: Boeing Aircraft Company, Procter & Gamble Co., Jacobs Engineering, Kuwait University, Kuwait Oil Company, Industrial Technology Research Institute (Taiwan), Caterpillar, and General Electric Company.

Dr. Simmons is Board-certified by examination in five areas of professional safety practice: System Safety, Engineering, Management, Construction Safety, and Comprehensive Practice. Professor Simmons' experience includes over twenty years of system and occupational safety engineering, industrial hygiene, and ergonomics consulting, teaching, research and development. His background includes manufacturing processes, the process chemical industry, semiconductor manufacturing, health care safety, and weapons system safety training. During 1995-1999, he served on the advisory committee of the National Safety Council's *Institute for Safety Through Design.*

He holds graduate degrees from California State University, Harvard University, and Texas A&M University. At the University of Cincinnati (UC), he had major responsibility for the graduate (M.S. and Ph.D.) program specializations in system and occupational safety engineering. Consistently rated as one of UC's most effective engineering professors, he is a recipient of the System Safety Society's Educator of the Year Award. He has also served the System Safety Society (SSS) at the national level as General Chairman for the 11th International System Safety Conference, Director for Education and Research (1989-93), and Director for International Affairs, Licensing, Certification, Professional Development and Awards (1995-99). He is currently the SSS Director for Education and Professional Development (2007-2011). Dr. Simmons has authored over 100 technical articles and presentations and is the co-author of a 1990 book, *An Engineering Approach to Occupational Safety and Health for Business and Industry* and a 1998 book, *Risk Management and System Safety*. Dr. Simmons is the editor of the Proceedings of the 24th and 26th International System Safety Conferences in 2006 and 2008, respectively. He is Technical Program Director for ISSC-2010.

System Safety Analysis Techniques for Engineers, Managers, and Occupational Safety and Health Professionals

Prof. Rodney J. Simmons, Ph.D., CSP

COURSE SYLLABUS/SCHEDULE *

1st Day ***First Half* — Introduction: System Safety in Singapore (1.0 hour); Overview of Selected Analytical Techniques (1 hour); Preliminary Hazard Analysis (1.5 hours)** — Introduction to the System Safety community in Singapore, motivation and context for system safety in Singapore, including regulatory drivers, and system safety resources. The main body of the course begins with an introduction to risk, including: What is risk? How is it recognized and how is it quantified? How much risk should be tolerated? How is risk reduced/controlled?

1st Day ***Second Half* — Continuation of Preliminary Hazard Analysis (0.75 hour); Barrier Analysis (0.75 hour) Failure Modes and Effects Analysis (2 hours)**— How to identify hazards and judge their risks systematically, in the absence of quantitative data. How to impose controls and judge their effectiveness at reducing risk. Workshop problems.

2nd Day ***First Half* — Quantitative Techniques: Fault Tree Analysis (3.5 hours)** — Powerful deductive analytical technique for modeling complex systems to identify vulnerability. Workshop problems.

2nd Day ***Second Half* — Quantitative Techniques: Fault Tree Analysis, cont'd, (3.5 hours)** — Additional detail on this powerful analytical technique for the modeling of complex systems. Workshop problems.

3rd Day ***First Half* — Quantitative Techniques: Combinatorial Probability Analysis Using Subjective Information (1 hour); Event Tree Analysis (2.5 hours)** — Powerful analytical techniques for the modeling of complex systems. How to assess the risk of combined hazards in the absence of numerical data. Additional analytical methods. Workshop problems.

3rd Day ***Second Half* — Qualitative/Quantitative Techniques: Cause-Consequence Analysis (1.5 hour); Guidelines on Procedure Writing (1 hour); Applications of System Safety in Singapore (0.5 hour); Review of Techniques (0.5 hour)** — Additional analytical techniques for identifying system response to various challenges. Discussion of approaches to minimize human error. Case studies, drawn from local professional practice (presented by senior-level practitioners in Singapore).

---

* The schedule shown is tentative. On-site adjustments will be made to accommodate special interests of the participants, to explore workshop problems at whatever level of detail best serves the purposes of the group, and for constructive classroom discussion. If there is special interest among participants in a particular topic, the schedule will be modified to permit introducing additional detail or for review. If necessary, some of the later topics will be shortened or eliminated to provide this flexibility. Coffee/tea/snack/lunch breaks will be scheduled.

Summary Course Syllabus/Schedule and Notebook Table of Contents

System Safety Analysis Techniques for Engineers, Managers, and Occupational Safety and Health Professionals

Day 1

Topic and Duration	Tab
Introduction: Context for System Safety and Risk Management in Singapore (1 hr)	
Overview of Selected Analytical Techniques (1 hr)	3
Preliminary Hazard Analysis (2.75 hr)	4
Energy Flow/Barrier Analysis (0.75 hr)	5
Failure Mode(s) and Effects Analysis (2 hr)	6

Day 2

Topic and Duration	Tab
Fault Tree Analysis (7 hr)	7

Day 3

Topic and Duration	Tab
Combinatorial Analysis Using Subjective Failure Information (1 hr)	9
Event Tree Analysis (2.5 hr)	10
Cause-Consequence Analysis (1.5 hr)	11
Guidelines for Writing Procedures (1 hr)	14
Case Studies from Singapore Defense Industry (0.5 hr)	
Review of Techniques (0.5 hr)	

Additional Background Information Included in Course Notebook for Self-study:

* The schedule shown is tentative. On-site adjustments will be made to accommodate special interests of the participants, to explore workshop problems at whatever level of detail best serves the purposes of the group, and for constructive classroom discussion. If there is special interest among participants in a particular topic, the schedule will be modified to permit introducing additional detail or for review. If necessary, some of the later topics will be shortened or eliminated to provide this flexibility. Coffee/tea/snack/lunch breaks will be scheduled.