INTRODUCTION

The statement that “Failures are stepping stones to success” is very true in engineering failures in general and in structural collapses in particular. All around the world, in countries advanced and backward alike, in rich and poor nations alike, bridges, buildings and other structures fail in some mode or other even in these days of advanced technology and codified methodologies.

When a construction accident happens or a structure fails, public attention and private concern focus on the injured people first and rightly too. Close on its heels comes the concern for property and/or environmental damage. Other financial loss usually does – and should – take the last priority.

During all the activity and emergency measures, very often the investigation of why and even how the accident happened receives scant attention. Actually, forensic professionals – namely those who investigate the accident, document the data, and analyse the findings – should hasten to the site as soon as possible, along with the ambulances and police, to investigate the accident before the trail grows cold.

The aim of forensic analysis should be to examine and document:

- The immediate causes of the accident, and then its underlying root causes;
- What sequence of decisions and events led to the accident and how;
- How recurrence of a similar accident not only under identical circumstances but also under predictably similar situations can be prevented in future; and,
- How the products and processes involved in the project can be improved so as to avoid or at least mitigate the adverse impact of such accidents in future.

These laudable goals can be achieved only through proper forensic engineering, involving:

- the scientific collection of accident data and its thorough analysis, and,
- extraction and dissemination of whatever conclusions can be derived from the analysis – in short, by learning from the failure.
Basic to this art and science of forensic engineering is the analysis of previous failures and drawing lessons from them.

Procedures and guidelines for forensic engineering are already well known and widely practised. In a manner of speaking, every time an expert or an expert committee investigates and reports on any accidents, forensic engineering is involved.

This two-day course will cover:
- Basics of forensic engineering
- Role and responsibilities of the forensic expert
- Principles and procedures of failure analysis
- Accident causation, investigation, and prevention
- Legal implications and viewpoints
- Hazard identification and risk management
- Case studies of structural failures from around the world
- Personal experiences of the instructors

Upon finishing the course, participants should be:
- Fully aware of the circumstances of and background to investigation of failures,
- Capable of understanding their causes and implications,
- Confident of analysing and managing the crisis, and,
- Become better involved in workplace safety culture.

FOR WHOM

The course will be useful to all safety officers and risk assessors, most engineers and other technical staff dealing with accident investigations and structural failures, and consequently to those who are involved in structural design, construction, maintenance, and demolition.

It will be of specific benefit to structural designers, contractors and sub-constructors, maintenance and demolition professionals, safety inspectors and supervisors, and trainers in temporary and permanent structural courses.

It will be useful to fresh graduates as an introduction to the real world of structural failures. Management cadre may also do well to understand the implications of accidents so as to prevent structural failure, encouraging and supporting proactive concepts in their organizations.

COURSE OUTLINE

Day 1:
Session 1-1 : Introduction to forensic engineering
Session 1-2 : Accident causation and prevention
Session 1-3 : Accident investigation
Session 1-4 : The legal viewpoint

Day 2:
Session 2-1 : Case studies from design failures
Session 2-2 : Case studies from construction failures
Session 2-3 : Hazard analysis and risk management
Session 2-4 : Lessons learned for structural and workplace safety
CV OF SPEAKERS

Professor N. Krishnamurthy

B.Sc., B.E.(Civil), M.S.(CE), Ph.D.
F.ASCE, F.SSSS, F.IE(India), M.ASEE, M.IE(Singapore), M.SRA

Professor Krishnamurthy is currently Consultant in Safety, Structures and Computer Applications in Singapore. He is an Accredited Trainer of the Singapore Ministry of Manpower to teach certain modules of safety-related courses of the Singapore Construction Safety and Consultancy (SC2), and Institution of Engineers (Singapore) Academy (IESA). He consults for Singapore companies such as QED Systems and Lim Kim Cheong Consultants. He is a MOM approved risk consultant.

He has nearly five decades of teaching, research, and consultancy experience, including teaching short courses for practicing engineers, in U.S.A., Singapore, India, Hong Kong, and Malaysia, in structural engineering, computer applications to civil engineering, and construction safety. In U.S.A. he held civil engineering professorial positions in three American universities, in the last of which he was Department Chairman. He has also held senior positions in the National University of Singapore, and the Mysore University in India. He ran the Vidyaranya Academy of Computing at Mysore, India for 11 years.

He has written three books, including his latest “Introduction to Risk Management”, co-authored two others, contributed to a few compilations, and published over seventy-five refereed papers. He was Chief Editor of a Guidebook on Scaffolds published by SC2.

In the last few years Professor Krishnamurthy has been teaching courses related to the safety, design, and erection of temporary structures such as scaffolding, formwork, falsework, and trench shoring. He was Chief Facilitator for safety and risk assessment workshops conducted by SC2 and IESA. He was MOM expert for the Fusionpolis steel latticework collapse. He is involved in investigations of other accidents and failures of temporary structures.

His publications related to safety may be downloaded from his website: www.profkrishna.com

Mr. Silas Sng

Director, Occupational Safety and Health Inspectorate, Ministry of Manpower.

Mr. Silas Sng oversees the team of inspectors in enforcing safety and health laws so as to improve workplace safety and health in the industry. He also oversees the investigation of fatal and serious accidents at the workplace and is thus familiar with the lapses that contribute to the accident.

Silas is a mechanical engineer by training and holds a Master degree in Public Administration.

Earlier, Silas was overseeing OSH Policy and Legislation, and was involved in the MND-MOM Construction Joint Review Committee that was set up in 2004 in the aftermath of the Nicoll Highway Collapse. He was also instrumental in the drafting of the new Workplace Safety and Health Act and the various subsidiary legislations.