

FORENSIC ENGINEERING IN DESIGN & CONSTRUCTION

LEARNING FROM FAILURES

Mumbai: 20th & 21st Feb 2012
Hotel Orchid

Chennai: 23rd & 24th Feb 2012
Radisson Blu

First Master-Class On Forensic Engineering for Construction & Infrastructure Projects



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 sophisticated 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, environmental damage, and/or time delay. Other financial loss usually does – and should – take the last priority.

During all these activities and emergency measures, very often the investigation of why and even how the accident happened receives scant attention. Ideally, forensic professionals should hasten to the site as soon as possible, along with the ambulances and police, to investigate the accident. However, except in very advanced countries, the investigators get to address the problem only after the other priorities have been taken care of and the trail has grown cold.

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

- a) The immediate causes of the accident, and its underlying root causes;
- b) What sequence of decisions and events led to the accident and how;
- c) How recurrence of a similar accident not only under identical circumstances but also under predictably similar situations can be prevented in future.
- d) 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:

- a) The scientific collection of accident data and its thorough analysis.
- b) Extraction and dissemination of whatever conclusions can be derived from the analysis.

in short, by learning from the failure.

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Two Day Short Course On Forensic Engineering For Construction & Infrastructure Projects

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 accident, forensic engineering is involved.

This two-day course will cover:

- Basics of forensic engineering
- Principles and procedures of failure analysis
- Accident causation, investigation, and prevention
- Case studies of structural failures from around the world
- Role and responsibilities of the forensic expert
- Tools of forensic engineering
- Legal implications and viewpoints
- Case studies of forensic analysis from around the world
- Personal experiences of the instructor

Upon finishing the course, participants should be:

- Fully aware of the factors that could affect most accidents,
- Capable of understanding their causes and implications,
- Confident of analysing and managing the crisis, and,
- Become more familiar with workplace safety culture.

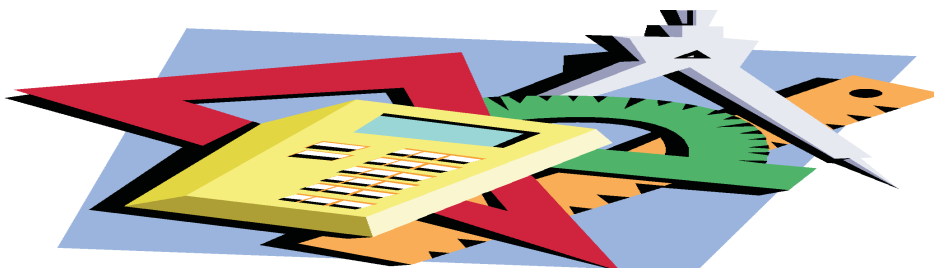
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The course will be useful to all safety officers and risk assessors, most engineers and other technical staff dealing with accident investigations and structural failures, and consequently to those who are involved in structural design, construction,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

It will be of particular 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 also be useful to fresh graduates as an introduction to the real world of structural failures.

Understanding the implications of accidents may even help management cadre in preventing structural and construction failures, by encouraging and supporting pro-active concepts in their organizations.



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COURSE INSTRUCTOR

Professor N. Krishnamurthy

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

M.ASEE, M.ASSE, 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 (MOM) to teach safety-related courses of the Singapore Construction Association Limited Academy, Institution of Engineers (Singapore) Academy (IESA), and PSB Academy.

He is a MOM approved risk consultant, and has conducted projects for them. He consults for construction companies in Singapore and India.

Dr. Krishnamurthy has more than 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 (NUS), and Mysore University in India. He ran the Vidyananya Academy of Computing at Mysore, India for 11 years.

He currently teaches at NUS, and at the Singapore campus of the University of Newcastle in Australia. He has written three books, including his latest "Introduction to Risk Management", co-authored two others, contributed to a few compilations, and published over eighty refereed papers.

In the last decade Professor Krishnamurthy has been consulting and teaching courses on workplace safety and risk management, including the safety, design, and erection of temporary structures such as scaffolding, framework, falsework, and trench shoring. He was Chief Facilitator for safety and risk assessment workshops conducted by SC2 Pte Ltd and IESA.

He was invited by MOM to investigate appear as the expert witness for the Fusionpolis steel latticework collapse of 2004. He is involved in investigations of other accidents and failures of temporary structures.

Course Outline

Day 1:

Session 1-1 : Basics of forensic engineering

Session 1-2 : Principles and procedures of failure analysis

Session 1-3 : Accident causation, investigation, and prevention

Session 1-4 : Case studies of structural failures from around the world

Day 2:

Session 2-1 : Tools of forensic engineering

Session 2-2 : Role and responsibilities of the forensic expert

Session 2-3 : Professional and legal implications and viewpoints

Session 2-4 : Case studies of forensic analysis from around the world

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Programme Schedule

Day One

Session 1-1 : Basics of Forensic Engineering

Forensic Engineering is the application of engineering in matters which relate to the jurisprudence system, including arbitration. An early example is the Dee bridge disaster of 1847. When liability lawsuits entered the failure scene in the late 1900's, forensic engineering spread in the courts as a means to determine culpability.

Session 1-2 : Principles and procedures of failure analysis

Forensic Engineering deals with investigation of accidents, documentation and analysis of data, and reporting of findings and recommendations. As courts are involved, the investigation must be strictly based on well tested and established procedures, with full documentation of the particular methods of analysis used. Expert witnesses are used for opinions.

Session 1-3 : Accident causation, investigation, and prevention

As it is unlikely that accidents are recorded as they happen, forensic investigation is based on an understanding of how accidents happen. The forensic engineer is not out to fix blame, but to determine accident causes and advise how to prevent it or at least minimise its impact in future.

Session 1-4 : Case studies of structural failures from around the world

Case studies, documented in detail by investigators of various accidents and failures around the world are the best source from forensic experts, for data, findings and recommendations. Structural failures are among the most common in this list. A review of their reports and assimilation of findings will provide valuable guidance.

Day Two

Session 2-1 : Tools of Forensic Engineering

Once the forensic engineer is called in, he/she should assemble the best tools available to analyse the data so as to lead to logical findings. Tools in current use range from simple tape measure to sophisticated Gas Chromatograph-Mass Spectrometer, together with established analytical procedures, enabled by super-human power of computers.

Session 2-2 : Role and responsibilities of the forensic expert

More than tools, forensic expert is key to successful accident and failure investigation. His/her main aim is to develop a detailed time-line, determine what went wrong, and how it affected the chain of events. He is a detective solving a mystery rather than a lawyer out to prove someone wrong.

Session 2-3 : Professional and legal implications and viewpoints

Often, particularly in advanced countries, accidents and failures end in courts to resolve litigious issues. Then, forensic investigators testify as expert witnesses, complex and technical ramifications to clarify for the court, in terms acceptable to both sides in the case. This role carries many professional and legal implications and commitments.

Session 2-4 : Case studies of forensic analysis from around the world

Published forensic analyses are the best resource for a forensic expert to fashion his/her documentation and report, as it is the report that would document all known facts of the case, opinions of the expert where necessary to bridge gaps or explain technical complexities,

DAILY SESSION TIMINGS

9.00am-10.30am: Session 1
10.30am-11.00am: Coffee Break
11.00am-12.30pm: Session 2
12.30pm-1.30pm: Lunch Break
1.30pm-3.00pm: Session 3
3.00pm-3.30pm: Coffee Break
3.30pm-5.00pm: Session 4



Delegates are requested:

...to occupy their seats early so that sessions starts on time
...to kindly put their phone on silent or vibratory mode
...to step outside & answer any phone calls received



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For details, please contact: Tel :+91 22 42758900 / Fax : +91 22 42758902

REGISTRATION

Please fill in the registration form for participation.

Standard Course Fees For Two Days
1 Delegate - ₹: 24,500/- (Base Price)
Service Tax As Applicable (10.3%)

for registration call:
Mr. Ravi On Tel: +91-22-42758903
Cell: 08898992866
Or Email. ravi@mindscapeasia.com

VENUE:	
21 st & 22 nd Feb 2012 Mumbai-Hotel Orchid	23 rd & 24 th Feb 2012 Chennai-Radisson Blu
Near Domestic Airport Vile Parle (E), Mumbai Tel: +91-22-26164040	531 GST Road Chennai 600016 Tel: +91-22-22310202

2 Ways for Making the Payment	Participants Details
<p>payment should be made within 5 working days from the date of invoice.</p> <p>1) by Cheque/DD drawn in favour of Mindscape Asia Incorporated payable at par in Mumbai.</p> <p>2) Please print this page fill the details & fax it for registration. FAX: +91-22-42758902.</p>	<p>Delegate Name: _____</p> <p>Designation: _____</p> <p>Email: _____</p> <p>Mobile No. _____</p> <p>Delegate Name: _____</p> <p>Designation: _____</p> <p>Email: _____</p> <p>Mobile No. _____</p> <p>Delegate Name: _____</p> <p>Designation: _____</p> <p>Email: _____</p> <p>Mobile No. _____</p>

Participation Fees Include: Workshop kit Documentation ,Refreshment, Luncheon, Certificate Of Participation

Terms & Conditions:

1. Fees are inclusive of programme materials and refreshments. 2. Payment Terms: Following completion and return of the registration form, full payment is required within 5 days from receipt of invoice. PLEASE NOTE: Payment must be received prior to the event date. A receipt will be issued on payment. Due to limited seats space, we advise early registration to avoid disappointment. A cancellation fee will be charged under the terms outlined below. 3. Cancellation/Substitution: Provided the total fee has been paid, substitutions at no extra charge will be allowed to attend the seminar. Substitutions prior to event and on date of the event will be allowed subject to an administration fee of equal to 10% of the total fee that is to be transferred. Otherwise all bookings carry a 50% cancellation liability immediately after a signed sales contract has been received by Mindscape Asia Incorporated (as defined above). Cancellations must be received in writing by an email or by fax three (3) weeks before the conference is to be held in order to obtain a credit voucher representing 50% of the total fee to be utilized against the cost of any future Mindscape Asia Inc. conference. Thereafter, the full conference fee is payable and is non-refundable. The service charge is completely non-refundable and non-creditable. Payment terms are five days and payment must be made prior to the start of the conference. By signing this contract, the client agrees that in case of dispute or cancellation of this contract that Mindscape Asia Inc. will not be able to mitigate its losses for any less than 50% of the total contract value in the event the cancellation is made one day before the event or on the day of the event then there will be no refund. If, for any reason, Mindscape Asia Inc. decides to cancel or postpone this conference, Mindscape Asia Inc. is not responsible for any covering airfare, hotel, or other travel costs incurred by clients. The conference fee will not be refunded, but can be credited to a future conference. Event programme content is subject to change without notice. 4. Copyright etc: All intellectual property rights in all materials produced or distributed by Mindscape Asia Inc. in connection with this event is expressly reserved and any unauthorized duplication, publication or distribution is prohibited.

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