

FORENSIC ENGINEERING WORKSHOP:

Structural Failures – cases, causes, lessons learned

Instructors:

John Duntemann, PE (Wiss Janney Elstner, Associates, USA)

David Peraza, PE (Exponent, USA)

Robert Ratay, PE, PhD (Columbia University, USA)

Dates:

Wednesday September 20, 2017 08:00-17:30

Location:

The Westin Bayshore Hotel & Conference Center

1601 Bayshore Drive, Vancouver, BC

Background to the Workshop:

Failures of structures occur in all parts of the world as the result of design errors, construction defects, abuse or misuse, lack of maintenance, aging and deterioration, as well as environmental effects such as wind, flood, snow, earthquakes and, of course, human error. They can result in heavy financial losses to all involved, catastrophic human costs, expensive delays and repairs, as well as other repercussions, including to the responsible parties.

“Welcome” effects of these unfortunate events include better understanding of the origins and causes of structural failures, lessons learned from them, and more effective mitigation of their occurrence through changes in codes, standards and practices.

In several countries the investigation of the causes of failures, responsibilities and resolution of the consequent claims have created an active, demanding and rewarding field of professional practice – often referred to as Forensic Structural Engineering – with well-defined technical and legal procedures.

IABSE Working Group 8 on Forensic Structural Engineering was formed in 2011. It aims to examine failures, improve the professional practice of forensic structural engineering, facilitate the dissemination failure information, and ultimately to enhance the mitigation of failures by improved structural design and construction practices throughout the world. This course was designed and the lecturers selected with those aims in mind.

Objectives

The primary objective of the workshop is to provide understanding of the origins, causes and consequences of failures, the lessons learned from them, and thereby to improve design practices and elevate the standard-of-care – all to mitigate errors that may lead to failures and liabilities of engineers. Secondary objectives are brief introductions to the “first steps” after a failure and an outline of the forensic investigation process “after the dust settled”.

Target audience

The workshop is aimed at a range of structural engineers: young, mid-career and experienced who want to acquire better understanding of failures towards improving their design, inspection, construction, administrative and other project-related practices to avoid pitfalls that may lead to failures. It is also informative to those wanting to acquire a working knowledge of, and embark on, the challenging and rewarding professional practice of forensic structural engineering,

The workshop will address:

- The understanding of structural failures, their origins, causes and consequences.
- The first steps after a failure, and the investigation process
- Cases, causes and lessons learned from failures in buildings, bridges, other permanent structures, and temporary structures in construction.
- Using the lessons learned for mitigating failures by meeting the standard-of-care, recognizing opportunities of catching design errors and construction defects, and affecting changes in codes & practices.
- Mitigating engineers' liability, and keeping out of trouble.

The workshop will close with a brief “working session” in which the attendees will debate the reports, causes, responsibilities and lessons from selected cases of actual failures – the reports will have been sent to registrants for review ahead of the workshop.

Reference material

Each attendee will receive a bound volume of documents that will include PDFs of over 400 PowerPoint slides of the speakers' presentations, and reprints of several journal articles for references.

Detailed Outline:

Time	Topic	Lecturer	Detailed Description
08.00 - 08.30	Registration		
08.30 - 09.30	Part A: Types & Origins of Errors, Defects & Failures	Ratay	What is Forensic Structural Engineering? What are structural failures? Origins, causes, consequences.
09.30 - 09.45	Coffee Break		
09.45 - 10.15	Part B - First Response: The First Steps After a Failure	Peraza	Engineers' first steps upon being informed of a structural failure.
10.15 - 10.45	Part C - Investigation: After the Dust Settled	Duntemann	Outline of the forensic investigation process
10.45 - 11.00	Brief Break for Discussion		
11.00 - 12.30	Part D1 - Cases, Causes & Lessons Learned	Peraza	Buildings Bridges Other permanent structures Temporary structures in construction
12.30 - 13.45	Lunch Break		
13.45 - 15.15	Part D2 - Cases, Causes & Lessons Learned	Duntemann	Buildings Bridges Other permanent structures Temporary structures in construction
15.15 - 15.30	Coffee Break		
15.30 - 16.15	Part E - Using the Lessons Learned to Mitigate Failures	Ratay	Understanding & meeting the standard of care Recognizing opportunities of catching mistakes Changes in codes & practices
16.15 - 17.00	Part F - Working Session	All	Debate by the attendees of the reports, causes, responsibilities and lessons from one or two selected cases of actual failures <i>NOTE: Case material emailed to the attendees a few days before the workshop</i>
17.00 - 17.30	Open Discussion & Networking	All	All presenters will be available for questions and open discussion.

* Draft schedule. All times and topics subject to change