



**PAUL DAVIS** BE(Civil) MIE(Aust) CPEng NPER

- Principal Engineer - Project X Solutions
- 30 years of experience in civil and structural design and construction.
- Investigated and reported on approximately 2000 damaged or defective structures.



**PAUL UNO** BE MBdgSc MIE(Aust) CPEng NER RPEQ  
APEC Engineer IntPE(Aus)

- Over 40 years of design and construction experience.
- Part-time Senior Lecturer – UNSW and The University of Sydney.

## WORKSHOP SUMMARY

Structures fail. The investigations of these failures are a field of engineering in itself but is also something that many engineers dip in an out of in the course of their work. As another strand of this work an engineer can sometimes be called upon to help stabilise a structure that has been damaged by fire, impacts or some sort of structural failure.

An investigating engineer requires deep experience and a well-rounded understanding of the underlying physical phenomenon, engineering theory, standards, design methodologies and construction process as well as a rigorous approach to investigation and reporting.

By examining fascinating cases from national and international experience, this course will provide some of the tools necessary for an engineer to investigate failed or damaged structures.

Additionally, knowledge of the environments and situations that can lead to failure can help design and construction professionals avoid their own mistakes. This is a form of risk management; it's far better to learn from someone else's mistakes than your own!

## PROGRAMME (8.30 - 9.00 Registration)

### 9.00 - 10.30 Session 1 (Paul Davis)

#### - INTRODUCTION, SYSTEMIC CAUSES OF FAILURE & THE PHYSICAL INVESTIGATION

After introductions, we examine the human and technical factors that can lead to a structural fault and then look at how we might go about the site investigation the failure or damage.

- Systematic Causes:
  - Education
  - Experience
  - Uncertainties
  - Design environment
  - Design processes
  - Chain of responsibility
  - Construction
- Investigation techniques:
  - Investigation team
  - Initial investigation
  - Dealing with emergency services, professionals, media and stakeholders.
  - Safe investigation methodology
  - Stabilisation – “make safes”
  - Recording methods
  - Gathering evidence



### 10.30 - 11.00 Morning Tea

### 11.00 - 12.30 Session 2 (Paul Davis)

#### - TECHNICAL REPORT WRITING

Technical report writing demands a clarity of approach and style which can be beneficial in fields beyond forensic engineering. The session includes:

- Language
- Layout
- Style
- Common mistakes
- Professional responsibilities
- Logical argument structures
- Practical exercise



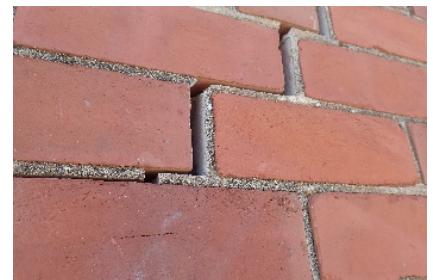
### 12.30 - 1.30 Lunch (Provided at Venue)

### 1.30 - 3.00 Session 3 (Paul Davis)

#### - CASE STUDIES: MATERIALS

The examination of real world failures helps us learn from the past and examine our own practices. With a focus on materials this session includes:

- Steel
  - Large portal frame roof collapse
  - Walkway collapse
  - Portal frame in cyclone
  - Floor dynamic failure
  - Bridge collapse
  - Arch collapse
- Concrete
  - Precast failures
  - Tilt Up wall collapses
  - Waterproofing
  - Ground slabs
  - Reinforced concrete failures
- Timber
  - Roof failures
  - Deflection Failures
  - Dynamic Failures
- Masonry
- Geotechnical
  - Retaining walls
  - Residential slabs
  - Bored pier failures
- Practical exercise



### 3.00 - 3.30 Afternoon Tea

### 3.30 - 5.00 Session 4 (Paul Uno)

#### - CASE STUDIES: ACTIONS

We continue our examination of real world failures with a focus on actions. This session includes:

- “Regular” actions:
  - Live loads
  - Wind
  - Snow
  - Earthquake
- “Exotic” actions
  - Fire
  - Water
  - Material deterioration
  - Impacts
- Practical exercise
- Course review



### 5.00 - 5.15 Certificate of Attendance & Feedback sheets

#### COURSE COST

- 1 day course – \$795 pp

#### DATES, VENUES & REGISTRATION

- Registration form (back of catalogue)
- Visit our website [www.etia.net.au](http://www.etia.net.au)

#### FURTHER INFORMATION

- Office (02) 9899 7447
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