Editorial

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I was privileged to attend the Fifth International Conference on Forensic Engineering, which took place on 16–17 April 2013, at One Great George Street, London, UK. Over the two days of the conference, the 150 delegates heard from speakers from 16 countries across six continents, each of whom demonstrated a thorough understanding of their chosen subject matter.

The conference agenda was organised to run in parallel themes broadly grouped into practical case studies, and data capture and learning, with a large number of papers presented throughout the two days. Each session concluded with a discussion, giving delegates the opportunity to ask the authors questions and comment on their own experience. The conference could not have taken place without the support of the sponsors, who provided excellent refreshments and an exhibition for the breakout sessions, followed by a convivial conference dinner. All of this combined to give the overall impression of a real international community in forensic engineering within which members could freely discuss issues with their peers in an open and collaborative environment.

I stress the aspect of communication and learning because it is often the case that the findings of forensic engineering reports are confidential and in particular remain so after the settlement of disputes. In addition, reputational and commercial interests will often hamper the dissemination of findings that could be made available. This theme was expressed on a number of occasions during the conference and during the networking sessions.

This issue of *Forensic Engineering* includes five of the conference papers from authors based in the UK, the Netherlands, France, Taiwan and Australia (from an Irishman using examples from Nasa), which gives some reflection of the international dimension of the conference. In opening the conference, event chair John Carpenter said ‘Managing our assets in the current harsh economic climate is of vital importance. We need to understand where we’ve gone wrong in the past.’ If there is a general theme to the papers in this issue of the journal it is to address that point and to show how some of the barriers to reporting can be overcome. The papers also show the immense benefits that can accrue from the collection, analysis and dissemination of data from failures and near misses.

Soane (2014) delivered his paper in the closing plenary session of the conference and it is perhaps fitting that his paper should

open this issue of the journal. Soane is the Director of Structural Safety, an organisation formed by the incorporation of Scoss (the Standing Committee on Structural Safety) and Cross (confidential reporting on structural safety) into one entity. His paper focusses on Cross, the confidential reporting system and the benefits that this organisation has delivered since its inception in 2005. His paper describes some very pertinent examples of incidents which, without the benefit of anonymity that Cross brings, would probably not have been reported in a manner that leads to the dissemination of and learning from the cause. Soane stresses the importance of examining ‘near misses’ in addition to failures and reminds us that there is negligible cost in learning from the former whilst the latter will often result in prosecution and even fatalities. Soane therefore sets the scene for the articles which follow.

The second paper is by Brady (2014) and was delivered in the opening plenary session of the conference. Brady will be well known to many of you as a truly international exponent of forensic engineering, who regularly shares his experience and knowledge with the community. His paper explores the barriers to learning the lessons from failures illustrated through an examination of some high profile incidents such as the Nasa Challenger disaster in 2003. He examines the complex reasons behind the common reluctance to recognise and publicise failures and also, as noted by Soane, the importance of identifying and analysing ‘near misses’ which are often, mistakenly, regarded as successes.

The next paper, by Terwel *et al.* (2014) asks the question ‘What patterns can be detected from the comparison of various sources of data in structural failures and near misses in the Netherlands?’ To answer the question Terwel and his team combined three diverse sources into one database, which was then analysed. The source information was taken from a confidential reporting system, Dutch arbitration awards and a newspaper archive for reports on structural failures. The differing nature of the purpose and quality of these sources was used to contrast and combine the results into a form that can be used to identify trends. The paper concludes by examining the relative risk of fatality from building failure and poses a relevant question on the application of such data in the development of Eurocodes.

Continuing with the theme of data collection and analyses, Breyse and Ndiaye (2014) describe the development of a

prototype failure database for use in risk management and education. They trace the development of the prototype through the emergence in France, of forensic engineering as a discipline linked to the management of risk in construction. In assembling the data for the prototype, Breyse and Ndiaye used many international sources, including Cross and interestingly, Wiki Failures. In total they examined over 960 cases of failure worldwide, categorising the principal causes and providing a statistical analysis of their effects. They suggest that with international cooperation and use of the Internet, a valuable resource could be developed that would assist future engineers with the calibration and assessment of risk in construction, in addition to providing a lessons learnt teaching resource.

One of the opening plenary sessions of the conference was delivered by Wei Lee, who described the effects on infrastructure, in particular bridges, that arise from flooding caused by typhoons. These events are common in Taiwan and in recent years have caused significant flood events that have destroyed a large number of bridges and caused many human casualties. In a development from that conference paper, Yen *et al.* (2014) present the final paper in this issue. Their paper describes the development of a high-tech safety monitoring system for bridges. The purpose of the system is to provide guidance on how a bridge is performing under flood conditions and to assist in decision making as to whether the bridge is safe to use. Yen *et al.* describe methods previously used for such prediction (such as water level, flow monitoring and scour depth monitoring) and illustrates their limitations. Building on the data from these methods, the authors describe the development and testing of a system to measure the vibration response of a bridge structure and how the response of the structure can be related to scour depth and hence provide warning of possible failure. The system was tested and calibrated on a bridge structure during a flood event and it is hoped that it will be developed to form part of an early warning system for bridges subjected to future flood events. The paper is an apt conclusion to this issue because it illustrates how the findings from forensic analysis of past

failures can be used in the prediction of possible future failure and while structural damage may still occur, the risk of fatalities could be greatly reduced.

Prior to the 2013 conference, the last ICE Forensic Engineering conference was in 2008, the proceedings of which remain a valuable resource (Neale, 2008). The excellent papers delivered in 2013, five of which are presented in this issue of the journal, will add to this pool of knowledge. The next conference is scheduled for April 2017 – put it in the diary now!

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