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Editorial

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The collective knowledge and wisdom of humans can increase only by discovery of new facts and the proper dissemination of the findings already known. While the former needs an 'off-the-beaten-track' approach, the latter advocates sticking to the 'well-trodden path'. In their endeavour to modify and control the environment so as to develop complex systems, humans generally prefer to take a cautious approach as any mistakes or misunderstandings of the physical world often lead to disastrous consequences. Such incidents constitute a 'lesson to be learned and passed on to others' so as to avoid repetition of the disaster in the future. Therefore, it is important to evolve scientific methods for investigating the cause of the disaster and then to be able to disseminate the information effectively to the concerned fraternity. The branch of engineering which does this is called 'forensic engineering'.

Although failures and disasters have been occurring from the dawn of civilization and lessons have been learnt from them, little attention was paid to the process itself since the reasons for failure were thought to be obvious. Thus, failures and disasters were attributed to mistakes or deviations from the normal, committed by individuals, or to the unpredictability of the physical world (nature) itself. Contrary to this practice, the basic precept of forensic engineering is to look at failures or disasters as a consequence of a flaw in the system of professional practice rather than as an isolated incident which could have been easily avoided. The Institution of Civil Engineers has been advocating this thought through its journal *Forensic Engineering*, which publishes articles which add credence to the above precept.

It has been realised that the systems of professional practice of both engineering and law are considerably different in developed and developing countries. While the practice and education of forensic engineering has progressed considerably in the developed world, it is practically unknown in the developing world. This, added to the fact that the amount and level of human activity has seen a marked increase in developing countries in recent years and the limitation posed by the availability of resources, makes it important to develop forensic engineering as a discipline to suit the professional environment in these countries. As a first step towards this objective, the journal decided to publish a themed issue on the subject.

In this themed issue, four full-length papers are presented, preceded by a briefing article. In the first full-length paper, titled 'Learning from experience to avoid collapse', Dr Soane (2016), who is Director for Structural Safety at the Institution of Structural Engineers, London, advocates that the basic principles of forensic engineering can be learnt by people in developing countries from their peers in developed countries who have gone through the learning process. He draws attention to the fact that increased urbanisation of developing countries could lead to increase in disasters and that there is an urgent need to take proactive steps to mitigate the risk of failures.

In the paper on 'Rapid structural assessment of garment factories in Bangladesh', Hodgson *et al*. (2016) give details of the assessment made on over 200 factories in the aftermath of a collapsed factory building. The paper highlights the issues related to documentation and quality control which are found wanting and the consequent risks generated in buildings which are in use. The assessment of foundation adequacy is rendered difficult due to the continued use of the building. Also, the political and media pressures under which the structural assessment needs to be carried out add a new dimension to the problem.

The paper on 'Lessons from structural failures in India' by Satish Kumar (2016) first highlights the typical state of affairs in the construction industry in most countries. It discusses the aspects of education, professional practice, legal frameworks and implementation needed to improve the situation. It then goes on to give several case studies where partial or total collapse occurred during or after construction. The causes of the collapses are identified and the paper tries to find systemic and policy solutions by which they can be avoided in the future.

Adding an entirely different dimension to forensic engineering is the paper by Gunn *et al*. (2016) on 'Aged embankment imaging and assessment using surface waves'. The development of the technique used is crucial to prevent failure of old earthwork infrastructure under extreme weather conditions.

Before all the full-length papers, Professor Sivakumar Babu (2016) gives a briefing on forensic geotechnical engineering, which was the theme of this year's August issue (Lee, 2016). He outlines the steps involved in identifying the cause of failure and taking preventive measures against them.

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