Editorial

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Forensic engineers aim at identifying the causes of failures of constructed facilities. Sometimes the results are used in legal proceedings. Sound investigations and reporting are essential because the results can be thoroughly examined by the opposite parties involved. The investigations in legal cases may result in severe consequences such as penalties.

Other investigations aim to learn from the failures and improve practices. These investigations may lead to changes in company approaches or even in legislation. Reliable investigations are necessary in these situations too, because erroneous conclusions might lead to insufficient measures.

Therefore, the reliability of both types of investigations is of utmost importance. Every phase of an investigation needs attention. This is the reason why *Forensic Engineering* initiated this themed issue on reliable forensic investigations.

When gathering facts after a failure it is often not clear what facts are needed to find the causes. How do you decide where to focus? Furthermore, when setting possible scenarios this procedure is often limited by the scope of the client's brief. What if you are not paid to look for possible scenarios that do not support the client's interest? Finally, when testing scenarios, what do you do with facts that do not match your most evident scenario? In short: what do you do to assure the quality of the investigation and reliability of the result?

Researchers with practical forensic experience from various faculties of Delft University of Technology tried to answer these questions by developing an integrated forensic investigation approach (Terwel *et al.*, 2018). They based their approach on established theories from the literature and also from human sciences. Furthermore, they used best practices from forensic investigations in aerospace engineering, civil engineering and biomechanical engineering, with the aim to increase reliability of investigations.

Professor Dekker, author of the very inspirational book *The Field Guide to Understanding 'Human Error'* (Dekker, 2014), was willing to contribute with an overview of possible biases to determine human influence in (technical) failures (Dekker, 2018). As over 90% of structural failures are attributed to human errors, it

is important to understand better the reason people were acting as they did prior to a failure.

For many forensic investigations, instruments are used to provide information to determine the cause of a failure. Thorniley-Walker *et al.* (2018) shared their experience in investigating settlement damage and they show that relatively simple movement gauges can provide reliable and useful information.

To become a mature forensic engineer, it is important to gain experience. This journal provides some examples of interesting case studies related to, especially, geotechnical structures, that can help readers to learn from the experience of other investigators.

Kog (2018) provides an overview of common causes for water leakages of underground structures. For design engineers this paper provides useful lessons to avoid or minimise these leakages in new designs.

Ashok Kumar *et al.* (2018) describe a case study of an industrial building constructed on expansive soil in India. They stress that this type of failure results in billions of dollars' worth of damage worldwide, and therefore a thorough understanding of this phenomenon is important.

Finally, a large failure of a reinforced earth wall in Hong Kong has been thoroughly examined and nicely reported (Lo *et al.*, 2018). The described steps in the investigation, testing – also with an unmanned vehicle because of a dangerous situation – and careful examining of possible causes provide an example of what a thorough investigation could look like.

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