

Editorial

Richard Harris BSc, CEng, FICE, FISTructE, FIMMM
Director, Time for Timber Ltd, UK

In this issue of *Engineering History and Heritage*, there are three papers. First, the briefing on the biography of civil engineers is written by Mike Chrimes, vice chair of the Institution of Civil Engineering (ICE) Panel for Historical Engineering Works (PHEW). There is a reprint of a significant paper from the ICE archives, introduced by *Engineering History and Heritage* (EHH) editorial panel member Don Friedman. Finally, there is a paper on the technical heritage of Madrid's bridges written by another EHH panel member, Jorge Bernabeu-Larena, and his co-authors.

Reading these papers makes me reflect on the significance of looking back to maximise the ability to look forward. As an undergraduate student in the late 1960s, I studied a BSc Civil Engineering course, which consisted largely of theory. As well as theory of structures, the first year included electrical engineering, mechanical engineering and graphical analysis. There was pure maths and applied mechanics. Material science was heavy on metallurgy, particularly for the phases of steel. Computer studies first required the mastering of a computing language. The course was broad in scope but intensive in study. It was heavy on mathematics. Design was more an exercise in analysis and calculation than creativity. The overall course content was interesting and demanding but it lacked context.

As I started work, I put aside my slide rule (calculators were hardly available – we shared one between four in the first design office that I worked in), and I started to learn the fundamentals of construction. I worked alongside experienced engineers, few of whom had university degrees, who showed me shortcut practical methods of design that had been long established as means to a solution. My university course had taught me an understanding of the theory behind these methods, of which my mentors, educated in engineering at evening classes, may not have had such deep knowledge. But the care with which they approached their work and their recognition of a correct solution was based on practice and precedent, not theory.

After some ten years of working in civil engineering contracting, both site management and temporary works design, I changed course and joined a small, newly started multi-discipline engineering practice with only thirty-five employees. This was Buro Happold, which had been formed by Ted Happold, formerly a director at Ove Arup and Partners. He had taken up the position of professor of Building Engineering at Bath University and had begun a consulting practice at the same time. I was surprised to find that an engineer known for his ground-breaking use of modern technology, especially for tensile structures, was passionate about understanding and teaching the history and heritage of engineering.

Ted Happold was hands-on in the management of his atelier. Design meetings would sometimes start at his house at 9pm, over a glass of wine. I had never experienced anything like it. His approach to engineering was very broad – he would rather be addressed as a designer than an engineer. He was interested to talk about architecture and he networked with the big-name architects, who valued his company and his opinions. In architecture, the study of history and precedent is fundamental to the training process. The Building Engineering course that Happold had pioneered was integrated with the study of architecture and so it was natural that engineers would learn from the past just as architects do. However, in my own experience, no one who had taught or mentored me before had ever looked back at engineering works that had gone before. I learned that Professor Happold gave lectures to his undergraduates on the history of engineering, and I took the time, when I could in a very busy office, to go up to the university to sit in on his lectures. His delivery was informal. Rather than stand in front of the class, he sat on the front bench and spoke conversationally.

Learning that we do not have to start from scratch every time we begin a new project was a great benefit to my design skills. Following up on his belief in study, the Buro Happold library had a fine collection of books and a professional librarian who would source any material that I might ask for. I became a passionate reader of past papers from the ICE and the Institution of Structural Engineers libraries. It was still the mid-80s and so papers either had to be found on a trip to London or delivered by post. It was not too late in my career to realise that I had found a powerful new tool to add to the analytical methods that I had been taught at university.

As the years went by, BSc courses have become BEng and the MEng is now the basic course to follow for those intending a career as a qualified civil or structural engineer. These courses are more focused on the broad skills needed for design than the BSc courses of the 1960s. And the best of them will include studies of past projects. In the next issue of this journal, Professor Gordon Masterton writes a briefing on why he, as chair of Future Infrastructure at the University of Edinburgh, considers it so important to look back in order to look forward (Masterton, 2023). Professor Masterton, a leading engineer of his generation, with many posts and responsibilities, demonstrates his commitment to learning and teaching from the past by finding the time to chair the ICE PHEW. Embedded in this panel is an extraordinary amount of knowledge with members who are passionate about its dissemination to the wider world of engineering. The portal to the PHEW is through the ICE website (<https://www.ice.org.uk/about-us/what-we-do/panel-for-historical-engineering-works>). The ICE archivist, Carol Morgan, has an intimate knowledge of the enormous collection

held by the ICE. I encourage all practicing engineers to explore, especially by digging into the PHEW database and by seeking out historical papers available online through the ICE Virtual Library.

Clearly, it is no longer necessary to make a personal visit to London to discover the incredible holdings of historical information within the ICE. However, I am aware that without learning from Ted Happold, all those years ago, I might not have been aware of the powerful benefit that reference to the past provides. Looking at history is not restricted to those involved in refurbishment and restoration – it is vital for the most forward-thinking engineering designers. Fine engineering comes from an understanding of the theory and good analytical skills – but it should start with a thorough understanding of how problems were addressed and solved in the past.

Looking more closely at the three papers in this issue, beginning with the briefing (Chrimes, 2023), the production of the *Biographical Dictionary of Civil Engineers of Great Britain and Ireland* (BDCE) began in the last century, with the first volume being published in 2002 (Skempton, 2002) and the third in 2014. Sir Alec Skempton (1914–2001), along with Karl Terzaghi, is recognised as one of the founding fathers of the engineering discipline of soil mechanics. Indeed, at Imperial College London, UK, the Civil and Environmental Engineering Department's building was renamed after him. Once again, we see a preeminent engineer – the man who set down the basis for a new branch of engineering – referring to the past and creating reference material for present and future engineers. Chrimes outlines the content of the three volumes of the BDCE and the work done by BCDE editors and others to advance the cause of civil engineering biography since. This valuable briefing article provides a route map that gives the reader access to the vast amount published information available on civil engineering biography.

Friedman (2023) has selected the *Proceedings of the Institution of Civil Engineers* paper from April 1909 'The "New York Times" Building' by Corydon Tyler Purdy. This paper can be accessed from the ICE Virtual Library but in republishing it, we are able to draw attention to a significant engineering paper that might otherwise go unnoticed by modern day civil and structural engineers. Purdy is writing about a structure that, at the time of completion of the Times Building in 1904, became the tallest occupied building in the

world. This was pioneering engineering and readers of the paper more than 100 years later will not only discover more about the remarkable engineering of the early skyscrapers but will learn about the challenges and solutions in creating an innovative structure.

Bernabeu-Larena *et al.* (2023) from UPM Technical University of Madrid, Spain, provides a fascinating paper that traces the construction technologies of Madrid's bridges and their evolution over the past five centuries. Madrid's bridges track the city's development. Crossing both rivers and other obstacles and connecting routes, they display a succession of materials, types and technological solutions.

The journal publishes its most recent articles Ahead of Print on its Virtual Library homepage, which allows the community quicker access to fresh content. Thus, Gordon Masterton's briefing (Masterton, 2023), which will be published in the next issue, is already available online. If this editorial promoting the value of the dissemination of engineering history and heritage has given you motivation to take part, please be aware that this journal is seeking new members for its editorial panel, and readers with suitable qualifications are invited to send their CV to the journal office.

REFERENCES

- Bernabeu-Larena J, Martín-Caro JA, Hernández-Lamas P and Gil Plana Á (2023) Technical heritage of Madrid's bridges, Spain. *Proceedings of the Institution of Civil Engineers – Engineering History and Heritage* **176**(3): 113–126, <https://doi.org/10.1680/jenhh.23.00012>.
- Chrimes M (2023) Briefing: British civil engineering biography – 10 years on. *Proceedings of the Institution of Civil Engineers – Engineering History and Heritage* **176**(3): 79–87, <https://doi.org/10.1680/jenhh.23.00015>.
- Friedman D (2023) Introduction to 'The "New York Times" Building' by D. Friedman. *Proceedings of the Institution of Civil Engineers – Engineering History and Heritage* **176**(3): 88–112, <https://doi.org/10.1680/jenhh.23.00008>.
- Masterton GGT (2023) Briefing: Engineering foresight from hindsight: why past knowledge is essential for future designers. *Proceedings of the Institution of Civil Engineers – Engineering History and Heritage*, <https://doi.org/10.1680/jenhh.23.00016>.
- Skempton AW (2002) *Biographical Dictionary of Civil Engineers of Great Britain and Ireland – Volume 1: 1500–1830*. Institution of Civil Engineers, London, UK.