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Editorial

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Welcome to the May issue of *Civil Engineering*, the flagship journal of the *Proceedings of the Institution of Civil Engineers*.

I have visited hundreds of sites around the world over the last 25 years. Quite a few featured top-down basement construction, an ingenious technique that obviously has many advantages. However, none of the projects I have visited was as ambitious as that described in the first paper, by Qingying Ren *et al.* (2016).

Designed by Zaha Hadid, the Nanjing Youth Olympic Centre in China features two towers, one of 58 stories, the other of 68, perched atop an extensive three-storey basement. Ground conditions were challenging: the site is located on the floodplain of the Yangtze River, with alluvial deposits overlaying soft mudstone. And because of the imminence of the 2014 Youth Olympic Games, less than 30 months was allowed for the construction phase.

A number of innovative solutions are described in the paper. Steel-concrete hybrid construction was used for most of the structures. Complex plunge columns supported superstructure erection while basement construction proceeded, and advanced concrete mixes were employed to minimise structural weight. All these factors contributed to a successful completion in time for the opening ceremony of the games.

Major infrastructure projects in the UK can suffer many complications at the planning stage – think High Speed 2 or Heathrow Terminal 5 – but nothing here compares to the challenges faced on infrastructure developments in the war-torn Balkans. As described by Wright (2016) in the second paper, these include dealing with complex politics and different ethnicities in areas of extreme poverty and high unemployment.

Five motorway projects dating back to 1998 illustrate both the challenges and the solutions that contributed to project success. New links both internally and on to Mediterranean ports and European transport corridors will have a transformative effect on the local economies, as did the actual construction phases. Local skills were enhanced, local entrepreneurs encouraged to become involved.

In the third paper, Nick Francis, formerly a major in the Royal Engineers, describes the vital contribution his unit made to winning another major battle – against the deadly Ebola virus in West Africa (Francis, 2016).

Six treatment units with 700 beds were rapidly constructed, three near the capital city, three out in the jungle. Each was designed to a common concept, one that managed the one-way flow of patients through the unit while maintaining the safety of medical staff.

A combination of simple blockwork construction and proprietary disaster-relief tents cut construction time down to just 5 weeks. A key early decision was to rely on in-country contractors for the building works rather than flying in hundreds of British Army engineers, although the available skills base varied hugely.

Finally, the fascinating potential of a class of materials that so far have been virtually overlooked by the construction industry is comprehensively illustrated by Chang and Araki (2016). Shape-memory alloys have been used on a very limited scale in the restoration of seismically vulnerable historic structures and to restrain excessive movements in bridge supports during seismic events. But the high cost of the early generations of shape-memory alloys has proved a major restraint on their wider application.

One exciting potential use is in the facades of so-called 'adaptive' buildings. These have shutters and ventilators that open and close in response to changes in light levels and air temperature and quality and even to vary the building's response to wind. Shape-memory alloy wires can replace electric motors in such applications. With the development of significantly cheaper copper- or iron-based alloys there should be many more examples of their use in the future.

I trust you enjoy reading the papers and articles in this issue. I also hope they will encourage you and your colleagues to consider sharing your own experiences through this and other ICE *Proceedings* journals.

References

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