Editorial

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Looking at the tremendous opportunities and challenges that bridge engineering of the future holds, one wonders how best to prepare current engineering students for these tasks. Whilst one may argue that even the most complex bridge structure behaves according to basic laws of nature and simple mechanics, there is a huge number of facets to actually designing good bridges. The expectations may never have been greater and the constraints never been more complex than today where besides structural strength, serviceability and aesthetics we also request, for example, robustness, low environmental impact, longevity and ease of maintenance – all in a cost optimised way both during construction and over the entire life cycle.

When the specific needs of bridge engineering are a moving target, then what are the core principles we should teach at university? One should think that a thorough understanding of structural types and their behaviour, bridge specific actions, principles of analysis and design of reinforced and post-tensioned concrete, steel and composite structural members, as well as a general knowledge of bearings and construction methodologies go a long way to being able to prepare a basic bridge design. That is what can realistically be covered in a module at Master's level and if taught at a methodological level will hopefully prove sustainable and future proof. Arguably that does not equip our future engineers with the more specific skills that will only be acquired through experience in practice.

That is probably the essence of bridge design (and perhaps any structural design): that the iteration cycles of actually doing it will help to complete the skill set required. However, what I also consider important is that both students and practising engineers try to learn from other engineers' experience. There is hardly a better way to do that than to read journals like this one. No single engineer will have been involved with a set of bridge designs and related issues as wide as that represented in this journal. I can thus only encourage every reader to try and pass on a copy of the journal or specific articles to young engineers to help them broaden their view as well as deepen their knowledge.

This issue of *Bridge Engineering* again contains an interesting mix of papers, showcasing the breadth of scope we cover. It is also again a truly international issue with papers coming from

four different countries. In the first article Collings and Gonzalez (2013) look at the similarities and differences between extradosed and girder as well as cable-stayed bridges. They attempt to define the concept of extradosed bridges more clearly and to that end show parametric studies on the basis of numerous project data. The paper offers a new criterion for classifying bridges as extradosed, the usefulness of which will have to be judged by practitioners going forward.

The second article by Thiebault *et al.* (2013) looks at life-cycle considerations in the design of railway bridges. Attempting to cover the entire life span of a bridge, the authors have developed a computer model that accounts for the major contributing effects. A sample bridge is selected to apply the model and to assess different design alternatives. The importance of different parameters is described in detail.

In the third paper Ho (2013) also looks at life-cycle effects, here in the management of footbridges. Such bridges are identified as medium-scale projects that normally receive little attention in terms of life-cycle costs. The paper proposes a new framework for managing footbridges at project level as well as network level.

Hackney *et al.* (2013) report on a new bridge and related works for Glasgow Central station. The main challenge was in coping with the existing, highly historical, infrastructure. The paper shows how such extremely complex constraints can be dealt with through a multidisciplinary approach to designing and building, thus delivering a truly impressive modification to Scotland's busiest railway station.

The Viana cable-stayed footbridge is the subject of the last paper, contributed by Barbosa *et al.* (2013). Being a moveable bridge, the mechanical, hydraulic and electrical components played a major role in its design. The paper describes the design and construction, as well as tests, on the dynamic excitability by pedestrian walking. The very detailed paper is a fine description of the sophisticated works that have been conducted.

Thanks are due to all authors for their papers. May I remind our readers that any paper is open for discussion. If you do wish to comment, please send a response to the journal; details of which can be found at the end of each paper.

REFERENCES

- Barbosa R, Magalhães F, Caetano E and Cunha A (2013) The Viana footbridge: construction and dynamic monitoring. *Proceedings of the Institution of Civil Engineers – Bridge Engineering* **166(4)**: 273–290, <http://dx.doi.org/10.1680/bren.10.00048>.
- Collings D and Gonzalez AS (2013) Extradosed and cable-stayed bridges, exploring the boundaries. *Proceedings of the Institution of Civil Engineers – Bridge Engineering* **166(4)**: 231–239, <http://dx.doi.org/10.1680/bren.10.00058>.
- Hackney M, Boothman D, Nutley S and Brown S (2013) Glasgow Central station: a new bridge, track and platforms. *Proceedings of the Institution of Civil Engineers – Bridge Engineering* **166(4)**: 262–272, <http://dx.doi.org/10.1680/bren.11.00021>.
- Ho LH (2013) Lifecycle management of footbridges: a framework. *Proceedings of the Institution of Civil Engineers – Bridge Engineering* **166(4)**: 252–261, <http://dx.doi.org/10.1680/bren.11.00004>.
- Thiebault V, Du G and Karoumi R (2013) Design of railway bridges considering life-cycle assessment. *Proceedings of the Institution of Civil Engineers – Bridge Engineering* **166(4)**: 240–251, <http://dx.doi.org/10.1680/bren.10.00054>.