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Editorial

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Engineering mechanics is often classified according to the phase of the substance under consideration (i.e. solid, fluid or multiphase) or whether the system is at rest (statics) or in motion (dynamics). Issue 2 of *Engineering and Computational Mechanics* contains papers on solid and fluid mechanics, covering both statics and dynamics. As all engineers know, mechanics involves the application of basic principles followed by pragmatic ingenuity and inventiveness. However, in mechanics many ideas have been rediscovered, misattributed, forgotten and later resurrected—see, for example, Tokaty's fiery broadside about misattribution.¹ Thus, one of the objectives of this journal is occasionally to reprint an old paper that still resonates in the modern world.

This issue of *Engineering and Computational Mechanics* commences with a reprint of a historical paper on the theory of continuous beams by John Mortimer Heppel. The paper was originally communicated by William John MacQuorn Rankine and had a major influence on bridge analysis in the late 19th century. The paper, which first appeared in the *Proceedings of the Royal Society of London* in 1870, gives a fascinating insight into the rapid pace of development of structural analysis, driven by the boom in civil engineering construction taking place in Victorian Britain. Rankine (1820–1872) was an engineering polymath, making contributions to thermodynamics (e.g. the heat engine, the Rankine steam cycle), fluid mechanics (shock waves, vortices), solid mechanics (fatigue failure due to stress concentration) and soil mechanics (lateral earth pressure theory and slope stability). He wrote *Manual of Applied Mechanics* (1858), *Manual of the Steam Engine and other Prime Movers* (1859), *Manual of Civil Engineering* (1861) and *Manual of Machinery and Millwork* (1869). Rankine was Regius Professor of Civil Engineering and Mechanics at Glasgow University from 1855 to 1872, spanning the date when Heppel's paper appeared. The author, John Mortimer Heppel (1817–1872), was a practising civil engineer who was employed in railway, canal, dock and river engineering; he also helped to set up an engineering factory in Germany.² Heppel was particularly renowned for his activities as chief engineer of the Madras railway. He became a member of the ICE and won the Telford Medal in 1855 for his paper 'On the Relative Proportions of the Top, Bottom, and Middle Webs of Iron Girders and Tubes' when Robert Stephenson was chair. In a sense, the Bird's Nest Olympic stadium in Beijing (designed by Herzog and De Meuron, Arup, and China Architectural

Design and Research Group), the engineering architecture of Santiago Calatrava and bridges designed by Michel Virlogeux (including the Milau Viaduct and Tagus Crossing in Lisbon) represent the modern fruits of structural analysis when combined with imagination and proper engineering practice.

The second paper, by Knight and Tang, presents analytical formulae for the stage–discharge relationship in open channels, derived using mass and momentum principles from fluid mechanics and validated against experimental measurements. The formulae should be useful to hydraulic engineers concerned with flows in straight prismatic channels. The paper by Razdolsky studies flexural buckling of a laced column. Razdolsky obtains deflection modes for a laced column with a cross-wise lattice and shows that local buckling causes instability. The findings should be of interest to designers of steel columns. The fourth paper, by Lee and Billington, considers concrete columns for bridges in earthquake-prone regions; it describes experimental measurements and finite-element analysis of the behaviour of fibre-reinforced concrete columns under periodic loading. This issue of *Engineering and Computational Mechanics* concludes with two short contributions. In the first, Baker gives an overview of past trends and future developments in wind engineering. In the second, Chanson discusses the growing influence of electronic publishing on engineering publications. Topics covered include quality control through the peer-review process, the problems posed by various unethical practices, and the development of open-access repositories.

It is hoped that the juxtaposition of old and modern papers in this issue will be of interest to readers of *Engineering and Computational Mechanics*. The differences in style between the papers should be particularly noteworthy. Victorian engineers were permitted to be much more long-winded than their more concise 21st century counterparts!

REFERENCES

1. TOKATY G. A. *A History and Philosophy of Fluid Mechanics*. Dover Publications, New York, 1971.
2. CROSS-RUDKIN P. S. M., CHRIMES M. M., BAILEY M. R., COX R. C., HURST B. L., MCWILLIAM R. C., RENNISON R. W., RUDDOCK E. C., SUTHERLAND R. J. M. and SWAILES T. (eds) *Biographical Dictionary of Civil Engineers in Great Britain and Ireland, Volume 2: 1830–1890*. Thomas Telford, London, 2008.