Editorial

Fehmi Cirak

We need a broad spectrum of mechanical models and computational techniques to design functional, efficient and resilient structures. They range from classical structural models that can be solved with a pen and paper to advanced nonlinear high-fidelity models that can only be solved numerically. That said, we cannot dismiss the practical appeal and utility of common design guides, like interaction diagrams or simple formulae.

The three papers in this issue of *Engineering and Computational Mechanics* cover almost the entire spectrum of models and computational techniques that are used in structural engineering today. The first paper by Chernin *et al.* (2019) provides an extensive review on pressure-impulse (P-I) diagrams widely used in the assessment of structural members under blast loading. P-I diagrams express the failure envelope of a member in a single chart, and their practicality and simplicity are undeniable. It is clear from the review that research on P-I diagrams is still thriving.

The second paper by Nekrasova *et al.* (2019) presents a new numerical technique for computing general plates on elastic foundations. The paper combines a finite difference method for discretising the plate with the boundary element method for the elastic half-space under it. It is interesting to note here the recent revival of finite differences with the emergence of new smooth basis functions, including meshless interpolants and splines. The significant efficiency advantage of finite differences over finite elements is one of the reasons why they should not be discounted.

Finally, the third paper by Vilnay *et al.* (2019) introduces a very detailed high-fidelity finite element model of an offshore jacket platform used in oil exploration. The geometrically and materially nonlinear model of the steel frame and the pile foundation demonstrates nicely the detail of modelling possible with commercial finite element software today. Notwithstanding this, as the presented computations indicate seemingly minor details, like joint flexibility, can have a significant effect on the numerical predictions.

I hope that you find this issue informative and inspiring as I have.

REFERENCES

- Chernin L, Vilnay M, Shufrin I and Cotsovos D (2019) Pressure-impulse diagram method – a fundamental review. *Proceedings of the Institution of Civil Engineers – Engineering and Computational Mechanics* **172(2)**: 55–69, <https://doi.org/10.1680/jencm.17.00017>.
- Nekrasova NN and Akchurina LV (2019) Numerical implementation of foundation slabs bending model with variable stiffness ratio rested on elastic foundation. *Proceedings of the Institution of Civil Engineers – Engineering and Computational Mechanics* **172(2)**: 70–78, <https://doi.org/10.1680/jencm.18.00002>.
- Vilnay M, Sivickij V, Watters F, Doerich-Stavridis C and Chernin L (2019) Fidelity of computational modelling of offshore jacket platforms. *Proceedings of the Institution of Civil Engineers – Engineering and Computational Mechanics* **172(2)**: 79–93, <https://doi.org/10.1680/jencm.19.00004>.