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Editorial

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Editorial

Subhrajit Dutta

Assistant Professor, Department of Civil Engineering, National Institute of Technology Silchar, Assam, India

Golam Kabir

Associate Professor, Industrial Systems Engineering, University of Regina, Regina, SK, Canada

Urban infrastructure systems, such as roads, bridges, housing, water supply, transport are vulnerable to natural and anthropogenic hazards during their service life. Functionality of these infrastructure are multidimensional and interdependent. Modern urbanisation requires the adoption of proactive scientific management for urban infrastructure to be more critical. Risk management and resilience-based design strategies have focused on reducing the likelihood of adverse effects on infrastructure due to disruptive events.

A prognostic strategy is critical to risk reduction due to undesired events or consequences; however, recent evidence suggests that not all undesired events can be prevented. The Australian wildfires are among the most recent examples of a disruptive event that adversely impacted multiple networked systems. Therefore, there is a definite requirement to plan and build resilient infrastructure systems through preparedness, response and recovery, which is an issue of growing importance in smart and sustainable cities. A comprehensive research-cum-implementation programme is thus required to develop a multi-dimensional resilience analysis and design for the interdependent and complex infrastructure systems.

This themed issue aims to highlight emerging research on multi-dimensional resilience analysis framework for urban infrastructure systems. To measure the resiliency of the urban infrastructure systems, various general metrics (e.g., robustness, rapidity, resourcefulness, redundancy, quality of service) have been defined in the literature. The first paper in this issue by Adey *et al.* (2022) demonstrates informed decisions on investments that optimally improve water supply resilience, taking into consideration both future uncertainty and management flexibility. The second contribution by Pal and Petkar (2022) evaluates the resilience of

healthcare infrastructure facilities with informal settlements in urban communities. They used remote sensing technologies along with machine learning tools to aid development in predictive measures for planning. The third paper by Chakraborty and Dutta (2022) is focused on the opportunities for a next-generation sustainable and resilient Indian railway infrastructure system along with a comparison with the global rail infrastructure.

Infrastructure resilience is considered as a combination of systems' absorptive, adaptive and restorative capacities. However, many problems in infrastructure resilience are focused on individual systems or individual component level vulnerability and restoration, rather than system resilience. There exists a highly coupled relationship among infrastructures, and the resilience of one system can impact the resilience of others. Therefore, through this themed issue, a multidisciplinary approach in urban resilience-assessment framework is presented along with the application of modern methods and tools to aid in informed planning and decision-making.

REFERENCES

- Adey BT, Martani C and Hackl J (2022) Investing in water supply resilience considering uncertainty and management flexibility. *Proceedings of the Institution of Civil Engineers – Smart Infrastructure and Construction* **175(3)**: 104–115, <https://doi.org/10.1680/jsmic.21.00005>.
- Chakraborty V and Dutta S (2022) Indian railway infrastructure systems: global comparison, challenges and opportunities. *Proceedings of the Institution of Civil Engineers – Smart Infrastructure and Construction* **175(3)**: 127–140, <https://doi.org/10.1680/jsmic.22.00014>.
- Pal I and Petkar A (2022) Evaluating healthcare access in informal settlements using satellites and neural networks. *Proceedings of the Institution of Civil Engineers – Smart Infrastructure and Construction* **175(3)**: 116–126, <https://doi.org/10.1680/jsmic.21.00006>.