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Disaster Prevention and Resilience

Editorial

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Disaster Prevention and Resilience: Article introduction in First Issue in Volume 3

***DPR* Editorial Office**

Xi'an Office Suite 1504, Xi'an 710077, Shaanxi, China.

Correspondence to: *DPR* Editorial Office, Xi'an Office Suite 1504, Tower A, Xi'an National Digital Publishing Base, No. 996 Tiangu 7th Road, Gaoxin District, Xi'an 710077, Shaanxi, China. E-mail: monica@dprjournal.com

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Since its inception in June 2021, *Disaster Prevention and Resilience* (*DPR*) has published 33 high-quality papers, including 1 Editorial, 28 Research Articles, 3 Reviews, and 1 Perspective. These publications have amassed 34,094 views and 14,021 downloads, reflecting considerable interest. In 2023, *DPR* released 4 issues with 23 articles, an approximately 65% increase over the previous two years, indicating substantial and gratifying advancement. Here, we express our sincere gratitude for the diligent efforts of the editorial team, the quality control of the editorial board members, the active participation of the young editorial committee members, and the rigorous review of the reviewers. Your hard work has significantly propelled the progress of the journal.

We announced the release of the first issue in early 2024. We now invite readers to explore the exciting discoveries in Volume 3, Issue 1 of *DPR*. This edition presents three outstanding research articles resolving key disaster prevention and response issues, providing new insights and solutions for strengthening social resilience and disaster management.

The first article, titled "Isolated shallow rocking foundation on different soils with varying embedment depth"[1], authored by R. Manoj Kannan, Putul Haldar, and Naveen James from India, investigates the efficacy of shallow rocking foundations in dissipating seismic energy and improving overall structural stability. It analyzes key parameters, including soil types and embedment depth, and rocking foundation effectiveness on seismic force and displacement demands of reinforced concrete buildings. The study indicates that rocking foundations reduce seismic force demands while slightly increasing displacement demands, regardless of embedment depth. Significant reductions in roof acceleration and seismic moment are observed compared to conventional designs, particularly in dense soil types. The findings suggest that under-proportioned footings can effectively reduce seismic force demands on such soil. However, further nonlinear finite element analysis is necessary to understand failure mechanisms associated with embedment depth. Overall, the research highlights the beneficial effects of rocking foundations in seismic design.

The second article, "Time-domain instability mechanism for artificial boundary condition of semi-infinite medium described by discrete rational approximation"[2] by Zhenyun Tang, Boxin Fu, and Xin Li from China, addresses instability in time-domain analysis of soil-structure interaction. It investigates using discrete rational approximation functions to represent foundation dynamic impedance. The researchers establish the closed-loop transfer function of the coupled system and examine instability causes through gain margin analysis. They discover that errors beyond the fitting frequency range of these functions cause instability, distorting dynamic characteristics at high frequencies. They also explore the effects of soil and structural characteristics and discrete-time steps on system stability. Limitations of the study, including its inability to handle soil nonlinearity and exclusive consideration of single deformation types, will be the subject of future research.

Lastly, the third article, "A domain decomposition solver for spectral stochastic finite element: an approximate sparse expansion approach"[3], authored by Bowen Luo, Wen Cao, Zheng Zhou, and Hongzhe Dai from China, proposes an approximate sparse expansion-based domain decomposition solver for spectral stochastic finite element (SSFE) analysis. The method tackles the computational challenges associated with solving the extended Schur complement (e-SC) system in SSFE by introducing an approximate sparse expansion technique. This approach reduces the computational burden by transforming the e-SC matrix-vector multiplication into operations involving smaller subdomain-level augmented matrices and vectors. Additionally, an approximate sparse preconditioner is developed to accelerate the convergence of the preconditioned conjugate gradient method used in solving the e-SC system. The solver significantly enhances the computational efficiency of SSFE, enabling it to handle large-scale engineering systems for uncertainty quantification. Two numerical examples involving stochastic analysis of a thin square plate and a planar frame structure demonstrate the effectiveness of the proposed method in improving the efficiency of stochastic response analysis regardless of the number of subdomains or the variance of the random field.

These articles offer valuable perspectives on critical disaster prevention and resilience concerns and provide new ideas and methodologies for understanding and responding to various disasters. We hope these findings inspire scholars to focus on disaster management and response strategies and collaborate to build safer, more resilient societies.

Furthermore, we sincerely invite scholars to contribute their research results in the domain of disaster prevention and resilience to *DPR*. We welcome original and cutting-edge research articles, reviews, technical reports, and reviews covering, but not limited to, earthquake engineering, flood management, climate change adaptation, emergency response, and social resilience. We eagerly anticipate sharing and advancing this area with you.

DECLARATIONS

Authors' contributions

Writing and revision of the article and approval of the final version: *DPR* Editorial Office

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Conflicts of interest

The author declared that there are no conflicts of interest.

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Not applicable.

Consent for publication

Not applicable.

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