Bingzhe Zhang

E-mail: zhangbz.pie@gmail.com zhangbz@seu.edu.cn
Website: bingzhezhang.github.io

My skill set focuses on the areas of the experimental study of seismic isolation systems, optimization of seismic performance on structures, and deterioration assessment of aged bridges. A second focus of my research is using artificial intelligence techniques to improve transportation infrastructure resilience under multi-hazard impact. In addition, I have over 8 years of experience in structure engineering including finite element analysis, structural performance testing, and structure design using in-house or commercial software.

EDUCATION

Ph.D. in Civil Engineering 09/2018 - 06/2024
Southeast University, Nanjing, China
• Bridge and Earthquake Engineering

Visiting Ph.D. scholar 03/2022 - 10/2023
McMaster University, ON, Canada
• Bridge Seismic and Machine Learning Application

M.S. in Civil Engineering 09/2016 - 06/2018
China Agricultural University, Beijing, China
• Structural Engineering

B.S. in Civil Engineering 09/2012 - 06/2016
China Agricultural University, Beijing, China
• Civil Engineering (with an emphasis on Structural Engineering)

PUBLICATIONS

- **Zhang, B.**, Wang, K., Lu, G., et al. Seismic Response Analysis and Evaluation of Laminated Rubber Bearing Supported Bridge Based on the Artificial Neural Network. *Shock and Vibration*, 2021.
- **Zhang, B.**; Wang, K.; Lu, G., et al. Experimental and Seismic Response Study of Laminated Rubber Bearings Considering Different Friction Interfaces. *Buildings*, 2022, 12, 1526.
- **Zhang, B.**, Wang, K. Seismic response analysis of small-to-medium-span bridges considering aging laminated rubber bearing. *17th WCEE*, 2019.
- **Zhang, B.**, Song, Y., Wang, K., et al. Study of influence of bearing types on seismic responses of Linyi Yellow River bridge. *Bridge Construction*, 2021, 51(3)-85-08. (in Chinese)
- Guo, W., Wang K., Yin W., **Zhang, B.**, et al. Research on seismic excitation direction of double-deck curved bridges: A probabilistic method based on the random forest algorithm. *Structures*, 2022, 39: 705-719.
- **Zhang, B.**, Yang, C., Lu, G., et al. Seismic damage assessment of bonded versus unbonded laminated rubber bearings: A deep learning perspective. *Engineering Structures.* (Accepted)
- **Zhang, B.**, Yang, C., Wang, K., et al. Life-cycle seismic performance analysis of an offshore small-to-medium span bridge based on Long Short-Term Memory model. *Structures*. (Under review)
- **Zhang, B.**, Yang, C., Wang, K., et al. Optimization of seismic performance of bridges with elastomeric bearings based on ANN and NSGA-II algorithms. *Computers and Structures.* (Under review)

RESEARCH EXPERIENCE

Research assistant, Department of Civil Engineering, McMaster University 01/2023 - 05/2023

- Constructing the bridge aging characteristic time series based on an existing chloride ion erosion model.
- Training and predicting the life-cycle seismic performance of the bridge using LSTM models.
- Investigating the impact of each aging characteristic on the long-term seismic performance.

Research assistant, Department of Civil Engineering, McMaster University 05/2023 - 10/2023

- Conducting statistical analysis on distributions of design parameters to generate samples of bridge group.
- Establishing a parametric finite element model in OpenSEES for nonlinear time history analysis.
- Forming a multi-objective optimization framework for bridge seismic isolation design parameters.

Research assistant, Department of Civil Engineering, McMaster University 09/2022 - 01/2023

- Parametric modeling based on the geometric and loading characteristics of bearings by ANSYS APDL.
- Performing high-precision damage pixel segmentation of stress distribution plot using U-net-based models.
- Quantifying the impact of factors on the damage of bearings through interpretable machine learning.

Research assistant, Department of Bridge Engineering, Southeast University, China 09/2020 - 09/2021

- Establishing a constitutive model for laminated rubber bearings using an ANN model based on experimental data.
- Developing a seismic demand model through ANN, and applying it to rapid seismic damage evaluation of bridges.
- Utilizing partial dependence to investigate the effect of bearing parameters on the bridge seismic demand.

INTERNSHIP EXPERIENCE

Research assistant, Research Institute of Highway Ministry of Transport, China. 01/2019 - 09/2020

- Performed FEA to figure out the high-pier bridge seismic response and the seismic isolation performance was optimized.

Engineer-in-training, China IPPR International Engineering CO., LTD, China. 05/2017 - 08/2017

- Participated in the structural design of a hospital using AutoCAD, specifically collaborating with the architect to complete the structural design of the stairs.

PROFESSIONAL EXPERIENCE

Research Collaborator, Ministry of Transport of China, Beijing, China. 05/2020 - 05/2021

Guidelines for Seismic Performance Evaluation of Highway Bridges

Graduate Teaching Assistant, China Agricultural University, Beijing, China. 09/2016 - 01/2017

Steel Structure Theory and Application

ACADEMIC SKILLS

Programming Languages	Python, MATLAB
Technological Tools	ANSYS, OpenSEES, SAP2000, AutoCAD

AWARDS

Merits Student Award, Southeast University	2019
Scholarship for Academic Excellence, China Agricultural University	2015