Exponent®
Engineering & Scientific Consulting

Sandeep Sony, Ph.D.

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Professional Profile

Dr. Sony specializes in damage diagnosis of civil infrastructure with a focus on buildings and bridges. His four years of industrial experience range from construction quality assessment to structural design, construction & retrofitting of buildings while mentoring junior engineers, managing sub-contractors, and engaging clients. Dr. Sony's technical capabilities span from a thorough knowledge of concrete materials, construction project management, technical analysis using data-driven methods, and employing machine-learning methods to solve complex structural engineering problems.

Dr. Sony provides state-of-the-art technical & strategic solutions for problems related to electric utility asset management, Infrastructure & Capital projects, Concrete and cement-based materials, Database management & data compliance for the infrastructure industry, Structural health monitoring and a wide variety of construction management issues.

Prior to joining Exponent, Dr. Sony had on-site work experience as QA/QC engineer, structural engineer, and construction manager. Dr. Sony worked on a variety of projects ranging from construction quality management of sixty-story luxury residential apartments to the design & construction of rural bridges. He was also involved in bridge feasibility analysis and retrofitting of old office complexes. Dr. Sony was appointed as Teaching Assistant at Western University, Canada for multiple undergraduate & graduate courses namely, Transportation Engineering, Numerical Methods for Civil Engineering and Advanced Reinforced Concrete Design. Dr. Sony's doctoral research involved identifying, localizing, and predicting the extent of damage using limited vibration measurements. He produced seven top-tier journal articles and is frequently invited to review leading scientific work.

Academic Credentials & Professional Honors

Ph.D., Civil and Environmental Engineering, The University of Western Ontario, Canada, 2021

M.Tech., Structural Engineering, Indian Institute of Technology, 2014

Prior Experience

Senior Structural Engineer, Sparsh Engineering Contractor, India

Quality Control/Assurance Engineer, Larsen and Toubro Ltd, India

Professional Affiliations

American Society of Civil Engineers (ASCE)

Project Management Institute (PMI)

Publications

Sony S, Gamage S, Sadhu A, Samarabandu J. Multiclass damage identification using one-dimensional convolutional neural network. Journal of Computing in Civil Engineering. American Society of Civil Engineering 2022; 36(2):04021035.

Sony S, Gamage S, Sadhu A, Samarabandu J. Vibration-based multiclass damage detection and localization using Long Short-Term Memory Networks. Structures. Elsevier 2022; 35:436-451.

Sony S, Sadhu A. Multivariate empirical mode decomposition-based structural damage localization using limited sensors. Journal of Vibration and Control. SAGE 2021; 10775463211006965.

Sony S, Dunphy K, Sadhu A, Capretz M. A systematic review of convolutional neural network-based structural condition assessment techniques. Engineering Structures. Elsevier 2021; 226:111347.

Sony S, Sadhu A. Synchrosqueezing transform-based identification of time-varying structural systems using multi-sensor data. Journal of Sound and Vibration. Elsevier 2020; 486:115576.

Sony S, Laventure S, Sadhu A. A literature review of next-generation smart sensing technology in structural health monitoring. Structural Control and Health Monitoring. Wiley 2019; 26(3):e2331.

Sadhu A, Sony S, Friesen P. Evaluation of progressive damage in structures using tensor decomposition-based wavelet analysis. Journal of Vibration and Control. SAGE 2019; 25(19-20):2595-2610.

Presentations

Sony S. Cost-Effective infrastructure monitoring using data-driven methods. Invited talk by Canadian Network of Asset Managers (CNAM), Toronto, ON, Canada, 2020.

Sony S, Sadhu A. Identification of progressive damage in structures using time-frequency methods. Proceedings, Annual Conference - Canadian Society for Civil Engineering 2019, Montreal, QB, Canada, 2019.

Lazhari M, Sony S, Sadhu A. A newer time-frequency decomposition-based modal identification technique for structures. 6th International Structural Specialty Conference 2018, Held as Part of the Canadian Society for Civil Engineering Annual Conference 2018, Fredericton, NB, Canada, 2018.

Project Experience

Project Advisory- Advising a market-dominant client on electric utility asset management while monitoring monthly financials, optimizing resources, and savings on yearly spending.

Data Compliance- Building and managing a database for utility infrastructure client to comply with federal regulations and empower them with data-driven decisions for the future.

Structural Design & Construction Management- Designed and managed the construction of 3-5 story residential buildings for a government client along with retrofitting old office complexes.

Bridge Design- Conducted feasibility analysis, designed single/double span solid slab rural bridges and oversaw their construction.

Quality Control & Assurance- Managed quality control and assurance for a $250 MM 60-storey residential apartment while employing a state-of-the-art quality assurance method, CONQUAS.

Peer Reviews

Elsevier

• Automation in Construction

• Engineering Structures

• Journal of Sound and Vibration

• Robotics and Autonomous Systems

• Transportation Geotechnics

• Multiple Sclerosis and Related Disorders

American Society of Civil Engineers (ASCE)

• Practice Periodical on Structural Design and Construction

Springer Nature

• Artificial Intelligence Review

Multidisciplinary Digital Publishing Institute

• Sensors

• Sustainability

• Infrastructures

• Electronics

• Symmetry