Dr. Shyamal Guchhait, Assistant Professor, NIT Rourkela, Rourkela

CONTACT INFORMATION

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RESEARCH INTERESTS

Inverse problem in computational mechanics, Structural health monitoring, Inverse damage or defect detection of elastic isotropic or anisotropic structures from static or dynamic measurements.

EDUCATION

Indian Institute of Technology Kharagpur, Kharagpur, INDIA

Ph.D., Department of Civil Engineering [Completed in 2018]

- Ph.D. Thesis Title: *Elastic Material Parameter Estimation: A Constitutive Error Based Approach*.
- Advisor: Dr. Biswanath Banerjee
- The objective of the thesis was to explore constitutive error based parameter estimation procedure for spatially homogeneous or heterogeneous, linear or nonlinear elastic material parameters from partial or full field response. Major contributions of the thesis are (i) Development of a material parameter identification procedure suitable for general linear and nonlinear elastic and thermo-elastic material using FEM, (ii) Development of an improved version of standard modified constitutive relation error (MECE) based identification technique for elastic material parameters in frequency-domain elasticity using full-field measurement, (iii) Extend the variant of ECE based identification procedure in damage detection problems of plate and shell structures using static and/or vibration response, (iv) Exploring parameter estimation scheme for hyperelastic materials in detecting inclusions or hard lumps within soft biological tissues considering geometric and/or material nonlinearity within error in constitutive equation framework.

Indian Institute of Technology Roorkee, Roorkee, INDIA

M.Tech., Structural Dynamics, Department of Earthquake Engineering [2008-2010]

- M.Tech. Thesis Title: *Evaluation of Adequacy of CDA for Steel Railway Bridges as per IRS Bridge Rules*.
- Advisers: Dr. Ashok D Pandey
- **CGPA:** 8.62/10
- Numerical studies have been done for checking the necessity of performance of the coefficient of dynamic augment (CDA) for steel bridges. Moving load and dynamic analyses have been performed for girder and steel bridges in numerical software SAP. The damage potentials of structural members have been computed using the rainflow counting algorithm and Palmgrem-Miner linear damage hypothesis. Ratios of maximum stress values and damage potential values of dynamic analysis cases to moving load analysis cases are found out for different train speeds and compared with the CDA values given by IRS Bridge Rules and EN 1991-2: 2003(E).

Bengal Engineering and Science University, Shibpur, West Bengal, INDIA

B.E., Department of Civil Engineering, [2004-2008]

- *First Class*
- **Percentage:** 72.0

Industrial Experience

Lahmeyer International (INDIA) Pvt. Ltd., Kolkata, West Bengal, INDIA, [17th November 2010 to 20th July 2012]

- *Civil Design Engineer*

Teaching Experience

Thapar Institute of Engineering & Technology, Patiala, Punjab, INDIA, [14th June 2018 to 17th June 2019]

- *Assistant professor*

Research Experience

CSIR-Structural Engineering Research Center, Chennai, INDIA, [1st July 2019 to 17th July 2020]

- *Scientist*

Refereed Journal Publications

[1] **Guchhait, S.** and Banerjee, B. "Constitutive error based material parameter estimation procedure for hyperelastic material" *Computer Methods in Applied Mechanics and Engineering*, 297, 455-475, 2015 (doi: http://dx.doi.org/10.20855/ijav.2016.21.1399).

[2] **Guchhait, S.** and Banerjee, B. "Anisotropic linear elastic parameter estimation using error in the constitutive equation functional" *In Proc. R. Soc. A*, 472, p. 20160213, 2016 (doi: 10.1098/rspa.2016.0213).

[3] Kumar, R., Mondal, S., **Guchhait, S.** and Jamatia, R. "Analytical approach for dynamic instability analysis of functionally graded skew plate under periodic axial compression" . *International Journal of Mechanical Sciences*, 130, 41-51, 2017 (doi: https://doi.org/10.1016/j.ijmecsci.2017.05.050).

[4] **Guchhait, S.** and Banerjee, B. "Constitutive error based parameter estimation technique for plate structures using free vibration signatures" *Journal of Sound and Vibration*, 419, 302-317, 2018 (doi: https://doi.org/10.1016/j.jsv.2018.01.020).

[5] **Guchhait, S.**, Banerjee, B. and Jayaram, A. "Thermo-elastic material parameters identification using modified error in constitutive equation approach" *Inverse Problems in Science and Engineering*, 26, 1-27, 2018 (doi: https://doi.org/10.1080/17415977.2018.1437157).

Conference Publications

[1] **Guchhait, S.** and Banerjee, B. "Material Parameter Identification in Transient Dynamics by Error in Constitutive Equation Approach" *Procedia Engineering*, 144, 512-519, 2016 (doi: https://doi.org/10.1016/j.proeng.2016.05.035).

[2] **Guchhait, S.** and Banerjee, B. "Hyperelastic material parameters estimation using error in constitutive equation approach" *Proceedings of the 6th International Conference on Theoretical, Applied, Computational and Experimental Mechanics*, IIT Kharagpur, Kharagpur, India, 2014.

[3] **Guchhait, S.** and Banerjee, B. "Error in Constitutive Equation based Approach for Isotropic Material Parameter Estimation in Frequency-Domain Elastodynamics" *Proceedings of the 7th International Congress on Computational Mechanics and Simulation (ICCMS)*, IIT Mandi, Mandi, India, 2019.

Programming Language and Software

- FORTRAN
- MATLAB
- ABAQUS