

Dr. Sahil Bansal

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Department of Civil Engineering
Indian Institute of Technology Delhi
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Date of Birth: 17-June-1987

Research Interests

Ultra High-Performance Concrete, Structural Safety and Reliability, Code calibration, Probabilistic Design Optimization, Uncertainty Quantification, Structural Health Monitoring.

Academic Qualifications

- Ph.D., Nanyang Technological University, Singapore (2015)
- B.Tech., Indian Institute of Technology (IIT) Delhi (2009)

Work experience

- Associate Professor, Department of Civil Engineering, Indian Institute of Technology Delhi (Dec 2023 to present)
- Assistant Professor, Department of Civil Engineering, Indian Institute of Technology Delhi (May 2019 to Dec 2023)
- Assistant Professor, Department of Civil Engineering, Indian Institute of Technology Roorkee (Jul 2018 to May 2019)
- Assistant Professor, Department of Civil Engineering, Thapar Institute of Engineering and Technology, Patiala (Jul 2017 to Jul 2018)
- Lecturer, Department of Civil Engineering, Thapar Institute of Engineering and Technology, Patiala (Jul 2016 to Jul 2017)
- Project Officer, School of Civil and Environmental Engineering, Nanyang Technological University, Singapore (Apr 2014 to Mar 2015)
- Assistant Project Manager, Gati Infrastructure Pvt. Ltd. (Sep 2009 to Nov 2009)

Teaching Experience

At IIT Delhi

Course Code	Course Name	Academic Year
CVL242	Structural Analysis	2021
CVL243	Reinforced Concrete Design	2020, 2021, 2022
CVL245	Construction Management	2019
CVP242*	Structural Analysis Laboratory	2019, 2020, 2022
CVP243*	Struct. & Mat. (Concrete) Lab	2019, 2020, 2021, 2022
NIN100*	Introduction to Engineering	2020, 2021
CVL857	Structural Safety and Reliability	2019, 2020, 2021, 2022
CVP756	Structural Engineering Lab*	

At IIT Roorkee

Course Code	Course Name	Academic Year
CEN208	Design of RC Elements	2018
CEN208	Design of RC Elements Lab*	2018
CEN308	Design of Structural Systems Lab*	2018

At TIET, Patiala

Course Code	Course Name	Academic Year
UES009	Mechanics	2016, 2017

UES010	Solids and Structures	2016, 2017
UES010	Solids and Structures Lab*	2017
UCE404	Structural Analysis	2017
UCE404	Structural Analysis Lab*	2017
UCE507	Advanced Structural Analysis	2016
UCE508	Design of Concrete Structures-I	2017
	Survey Camp*	2017

* Shared teaching load

Projects

Sponsored R&D Projects as PI

#	Project Title	Funding Agency	Funds (Rs in Lacs)	Start Date	End Date	Status
1.	R&D Studies on High-Performance Concrete for Sluice Spillways of Dams and Barrages	SJVN Ltd.	109.79	Feb-23	Jul-25	Ongoing
2.	Development of Design Parameter & Acceptance Criteria for use of Ultra-High-Performance Concrete (UHPC)	BRO, GOI	79.90	Mar-22	Mar-24	Ongoing
3.	Bayesian Model Updating Approach for Systematic Damage Detection	ARDB-DRDO, GOI	44.99	Sep-19	Mar-21	Ongoing
4.	Structural health monitoring based on Bayesian approach using vibration data	SERB, DST	30.05	Jan-20	Dec-21	Completed
5.	Equipment Matching Grant to Prof. Sahil Bansal	IRD, IIT Delhi India	16.78	May-21	Dec-21	Completed
6.	Uncertainty assessment of structural systems using the Bayesian approach	Planning Unit, IIT Delhi	20.00	Jul-19	Jul-21	Completed
7.	Development of High-Performance Fiber-Reinforced Concrete for Building Applications	NTTM, GOI	99.60			Ongoing

Total amount: 291.32 Lacs

Sponsored R&D Projects as Co-PI

#	Project Title	Funding Agency	Funds (Rs In Lacs)	Start Date	End Date	Status
1.	Assessment of PI/PU Insulation for thermal comfort and Energy Efficiency	Kingspan Jindal Pvt. Ltd.	25.14	Nov-22	Jan-24	Ongoing
2.	Virtual Concrete Structures Lab (Sub Project under Virtual Lab Phase - III)	MOE, GOI	7.20	Nov-22	Mar-24	Ongoing

Total amount: 32.34 Lacs

Consulting Projects

Project Title	Sponsoring Agency
Structural Drawing Proof Check of NCCE Hostel Building at National Co-operative Union of India (NCUI)	NBCC (India) Limited, New Delhi

Vetting of Structural Drawing for Jodhpur Railway Station	Vishal Infrastructure Limited, Jodhpur
Vetting of Structural Design and Drawings of the Residential Building of Gujarat Biotech Uni, Gujarat	Gujarat Biotechnology University, Gujarat
Strengthening of Pillars at the Air Force School	The Air Force School, New Delhi
Design Mix for the University of Delhi	Baba Construction Private Limited, India
Quality Check and Compressive Strength Assessment of Casted Concrete of Bagrrys India Pvt. Ltd	Mittal Construction Company
Vetting of Design of Water Tank Tower	Troynoy A Private Limited
Structural Health Assessment of Institute Building of National Institute of Public Cooperation & Child Development, New Delhi	CPWD
Review of Structural Design for Major Upgradation/Development/Redevelopment of Ghaziabad Railway Station of Delhi Division of Northern Railway	Sindhuja Engineers and Contractors
Vetting of the Structural Design at sector 16A Noida	SAM (India) Builtwell Private Limited
Visual Inspection & Condition Assessment of Structures at IIML Noida Campus	IIM Lucknow
Structural Audit of Structures at Water Treatment Plant Chandu	GMDA, Gurgaon
Compressive Strength Assessment of Casted Concrete	HSCC (India) Ltd.
Vetting of Transmission Towers for Ramwa Fathepur Transmission Line	Gayatri Ganga Construction,
Methodology for Casting and Testing of M80 Concrete and Rectification of Post Pour Concrete	KPC Projects Limited
M30 Pumpable Mix Design	Dyna Filters Private Limited
Structure Vetting of Hotel Project at Raj Nagar Extension Ghaziabad	F2S
Testing of Concrete Core Samples (6 Sets), IIT Delhi	DMRD Limited
Vetting of Drawings and Calculations for 6th Floor Slab Strengthening at Tower-1 of Existing Building of New Police Headquarters	Design Ethics Architects
Vetting of Structural Design of Transmission Line Towers 220 KV for North Central Railway	Gayatri Ganga Construction
Vetting of Tower Spotting Data for Transmission Line Towers	Gayatri Ganga Construction
Review of Foundation Design of Transmission Line Towers for UPPTCL	GEPDEC Infratech Limited
Vetting of Structural drawing of Steel Sheds (Shukla Developers)	Shukla Promoters & Developers Pvt. Ltd.
Tower Foundation Design & Drawings Vetting for Different Heights & Wind Velocity (3rd phase)	HFCL Ltd.
Vetting of Design and Drawings and BOM of 3 Nos 220 KV D/C Towers	Gayatri Ganga Construction
Artwork IIT Jodhpur	CPWD
Proof Checking of Detailing Design and Drawings for RAIL VIKAS NIGAM LIMITED	Rail Vikas Nigam Ltd.
Structural Vetting of Ophthalmology Building at IGIMS-Patna	Universal Contractors and Engineers Pvt. Ltd.
Review of Structural Design of Transmission Line Towers for UPPTCL	GEPDEC Infratech Limited
Tower Foundation Design & Calculation Validation Different Heights & Wind Velocity. (GBT & RTT)	HFCL Ltd.
Proof Checking of Structural Design and Drawings of Proposed Type-V and Type-IV (spl) Dwelling Units in the Residential Colony of AIIMS, New Delhi	SAM (India) Builtwell Pvt. Ltd.
Monopole Pile Foundation Vetting	JBS POWERS
Vetting of Structural Design and Drawings for the Towers and Foundation for GOA EWDS NCRMP-II Project	Telecon Systems

Review of Civil Foundation Design and Drawings of 220kV Transmission Line Towers for UPPTCL	Apollo International Ltd.
200 KV LILO O/H TL & 132KV TL Pile Foundation using Monopole Towers for Construction of 220/132/33KV GIS S/S Baliana	JBS POWERS
Review of structural design of transmission line towers for UPPTCT	Apollo International Ltd.
Technical Advice on extension of deck slab and suitability of pier cap for position of bearing	Ductile Design Consultancy Pvt Ltd.
Review/Vetting of Structural Drawings of foundation and monopole	G-Eng Advisory Services Pvt Ltd.
Checking and Approval of structural design calculations and drawings for tower foundation vide tender NFS MW-T508/2015	HFCL Ltd.
Review of structural drawings of building structure, boundary wall, retaining wall and water tank for construction of FSTP (10 KLD) Chunar Mirzapur	Elefo Biotech Pvt. Ltd.
Vetting of Design and Drawings of Heavy Duty Multi Tier Pre Fabricated Steel Rack Storage System.	Vinar Systems Pvt Ltd.
Feasibility Report on Extension Work at Defence land and contonment services cooperative group housing society ltd in Dwarka	Design N Design
Vetting of design for 12 meter bridge for PWD Almora Districh UK	PWD Uttarakhand
Vetting of design for 20.8 meter pre-stressed precast girder (centre to centre of bearing)	U.P. State Bridge Corp. Ltd.
Proof checking/vetting of structural drawing of STP	R K Bhambri India
Structural Audit For Repair Renovation Of Overhead And Underground Tank In VV Giri National Labour Institute, Sector 24, Noida	CPWD
Structural Audit of ESIC Colony, Sector-56, Noida, U.P.	ESIC
Proof Checking of Multi Level underground Parking at Ram Niwas Bagh, Jaipur	Jaipur Development Authority
Reconnaissance Survey of PMO Roof Structure	CPWD

Publications

International Journals

- Henikish, E. K. and S. Bansal, Model Reduction Based Bayesian Updating of Non-Classically Damped Systems Using Modal Data from Multiple Setups, 2023.
<https://rdcu.be/dwGIw>
- Bansal, S. and P. Kumar, Assessment of One-Way Shear Design Method of IS-456:2000, Journal of Structural Engineering CSIR-SERC (Accepted).
- Khalid, M. A. and S. Bansal, Improved Stochastic Subset Optimization Method for Structural Design Optimization, Advances in Engineering Software 2023. 188: p. 103568.
<https://doi.org/10.1016/j.advengsoft.2023.103568>
- Das A. and S. Bansal, Hierarchical Bayesian model updating using modal data based on dynamic condensation, Journal of Vibration Engineering & Technologies 2023.
<https://rdcu.be/dlZUd>
- Garg, V., K. Deep and S. Bansal, Improved Teaching Learning Algorithm with Laplacian Operator for Solving Nonlinear Engineering Optimization Problems, Engineering Applications of Artificial Intelligence, 2023. 124: p. 106549.
<https://doi.org/10.1016/j.engappai.2023.106549>
IF 7.802 SCIE
- Das A., R. P. Kiran and S. Bansal, A novel Metropolis-within-Gibbs sampler for Bayesian model updating using modal data based on dynamic reduction, Structural Engineering and Mechanics-An International Journal, 2023. 87.
<https://doi.org/10.12989/sem.2023.87.1.000>
IF 2.998 SCIE

7. Meena, A., S. Yadav, A. K. Jha and S. Bansal, Improved Design Recommendation for Biaxially Loaded Rectangular RC Columns, *Sadhana*, 2023. 48(101)
<https://doi.org/10.1007/s12046-023-02153-9>
IF 1.214 SCIE
8. Henikish, E. K., A. Das and S. Bansal, On the Bayesian Model Updating Based on Model Reduction Using Complex Modal Data for Damage Detection, *Journal of Sound and Vibration*, 2023. 556: p. 117712.
<https://doi.org/10.1016/j.jsv.2023.117712>
IF 4.761 SCIE
9. Rather, S. and S. Bansal, Bayesian Modal Identification of Non-Classically Damped Systems Using Time-Domain Data, *Mechanical Systems and Signal Processing*, 2023. 197: p. 110349.
<https://doi.org/10.1016/j.ymssp.2023.110349>
IF 8.934 SCIE
10. Khalid, M. A. and S. Bansal, A Framework for Robust Design Optimization of Tuned Mass Dampers by Stochastic Subset Optimization, *International Journal of Structural Stability and Dynamics*, Accepted.
<https://doi.org/10.1142/S0219455423501559>
IF 2.957 SCIE
11. Khalid, M. A., S. Bansal and V. Ramamohan, An Augmented Formulation for Robust Design Optimization of Structures using Stochastic Simulation Methods. *Research in Engineering Design*, 2022.
<https://doi.org/10.1007/s00163-022-00405-z>
IF 2.964 SCIE
12. Bansal, S. and S.H. Cheung, On the Bayesian sensor placement for two-stage structural model updating and its validation. *Mechanical Systems and Signal Processing*, 2022. 169.
<https://doi.org/10.1016/j.ymssp.2021.108578>
IF 8.934 SCIE
13. Iqbal, T. and S. Bansal, Reliability Analysis of Flexural Members Designed as per Indian Standard Code. *Sadhana*, 2021. 46(185).
<https://doi.org/10.1007/s12046-021-01715-z>
IF 1.214 SCIE
14. Bansal, S., Bayesian Model Updating using Modal Data Based on Dynamic Condensation. *ASCE Journal of Engineering Mechanics*, 2020. 146(2).
[https://doi.org/10.1061/\(ASCE\)EM.1943-7889.0001714](https://doi.org/10.1061/(ASCE)EM.1943-7889.0001714)
IF 3.125 SCIE
15. Bansal, S., Bayesian Optimal Experimental Design Involving Multiple Setups for Dynamic Structural Testing. *International Journal for Uncertainty Quantification*, 2019. 9(5): p. 439-452
<https://doi.org/10.1615/Int.J.UncertaintyQuantification.2019025897>
IF 4.911 SCIE
16. Bansal, S. and S.H. Cheung, A subset simulation based approach with modified conditional sampling and estimator for loss exceedance curve computation. *Reliability Engineering & System Safety*, 2018. 177: p. 94-107.
<https://doi.org/10.1016/j.ress.2018.05.003>
IF 7.247 SCIE
17. Bansal, S. and S.H. Cheung, On the evaluation of multiple failure probability curves in reliability analysis with multiple performance functions. *Reliability Engineering & System Safety*, 2017. 167: p. 583-594.
<https://doi.org/10.1016/j.ress.2017.07.010>
IF 7.247 SCIE
18. Bansal, S. and S.H. Cheung, A new stochastic simulation algorithm for updating robust reliability of linear structural dynamic systems subjected to future Gaussian excitations. *Computer Methods in*

Applied Mechanics and Engineering, 2017. 326: p. 481-504.

<https://doi.org/10.1016/j.cma.2017.07.032>

IF 6.588 SCIE

19. Cheung, S.H. and S. Bansal, A new Gibbs sampling based algorithm for Bayesian model updating with incomplete complex modal data. Mechanical Systems and Signal Processing, 2017. 92: p. 156-172.

<https://doi.org/10.1016/j.ymssp.2017.01.015>

IF 8.934 SCIE

20. Bansal, S. and S.H. Cheung, Stochastic Simulation Algorithm for Robust Reliability Updating of Structural Dynamic Systems Based on Incomplete Modal Data. ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering, 2017. 3(4): p. 04017008.

<https://doi.org/10.1061/AJRUA6.0000911>

IF 3.084 SCIE

21. Bansal, S. and S.H. Cheung, Stochastic Sampling based Bayesian Model Updating with Incomplete Modal Data. International Journal for Uncertainty Quantification, 2016. 6(3): p. 229-244.

<https://doi.org/10.1615/Int.J.UncertaintyQuantification.2016017194>

IF 4.911 SCIE

22. Bansal, S., A New Gibbs Sampling Based Bayesian Model Updating Approach using Modal Data from Multiple Setups. International Journal for Uncertainty Quantification, 2015. 5(4): p. 361-374.

<https://doi.org/10.1615/Int.J.UncertaintyQuantification.2015013581>

IF 4.911 SCIE

23. Bhalla, S., A. Gupta, S. Bansal and T. Garg, Ultra Low-cost Adaptations of Electro-mechanical Impedance Technique for Structural Health Monitoring. Journal of Intelligent Material Systems and Structures, 2009. 20(8): p. 991-999.

<https://doi.org/10.1177/1045389X08100384>

IF 2.774 SCIE

**IF status on 20-06-2023*

Conference presentation/proceedings

1. Das, J. K., N. Manhas, S. Bishnoi, S. Bansal and A. Shukla, Mix design of Ultra-High Performance Concrete using particle packing optimization. 16th International Congress on the Chemistry of Cement. 2023. Bangkok, Thailand.
2. Henikish, E. and S. Bansal, A Two-Stage Model Updating Using Data from Multiple Experimental Setups. XII International conference on structural dynamics EUROLYN 2023. Delft, The Netherlands.
3. Khalid, M.A. and S. Bansal, On the improvement of design space subsets formulation for iteratively optimizing structural systems. XII International conference on structural dynamics EUROLYN 2023. Delft, The Netherlands.
4. Bansal, S. and P. Kumar, Assessment of One-Way Shear Design Methods of per IS-456. 4th Structural Integrity Conference and Exhibition 2022. Hyderabad, India.
5. Kiran, R.P. and S. Bansal, Finite Element Model Updating using Modal Data. 4th Structural Integrity Conference and Exhibition 2022. Hyderabad, India.
6. Das, J. K., S. Bansal, S. Bishnoi and A. Shukla, Mix design of Ultra-High Performance Concrete using particle packing optimization. 4th Structural Integrity Conference and Exhibition. 2022. Hyderabad, India
7. Rather, S. and S. Bansal, Operational Modal identification using Bayesian approach. 4th Structural Integrity Conference and Exhibition 2022. Hyderabad, India.
8. Khalid, M.A. and S. Bansal, Robust Design Optimization of Tuned Mass Damper. 4th Structural Integrity Conference and Exhibition 2022. Hyderabad, India.
9. Khalid, M.A. and S. Bansal, Robust design optimization of structures using stochastic simulation based approach. The 14th International Conference on Computational Structures Technology 2022. Montpellier, France.

<http://dx.doi.org/10.4203/ccc.3.4.4>

10. Khalid, M.A. and S. Bansal, Robust Design Optimization Under Uncertain Structural Parameters by Stochastic Simulation-Based Approach. 15th World Congress on Computational Mechanics (WCCM-XV) and 8th Asian Pacific Congress on Computational Mechanics (APCOM-VIII). 2022. Yokohama, Japan.
<http://dx.doi.org/10.23967/wccm-apcom.2022.100>
11. Henikish, E., S. Bansal and R. Kiran, Bayesian Model updating of Linear dynamic systems using complex modal data. 15th World Congress on Computational Mechanics (WCCM-XV) and 8th Asian Pacific Congress on Computational Mechanics (APCOM-VIII). 2022. Yokohama, Japan.
<http://dx.doi.org/10.23967/wccm-apcom.2022.023>
12. Bansal, S. and G. Jindal, Validation of Bayesian Experimental Design for Structural Testing. 14th World Congress in Computational Mechanics (WCCM) and ECCOMAS Congress. 2020. Paris, France.
13. Bansal, S., Optimal Sensor Placement for Structural Model Updating Based on Bayesian Approach. 11th Structural Engineering Convention. 2018. Jadavpur University, Kolkata, India.
14. Bansal, S. and S.H. Cheung, Stochastic Simulation Based Reliability Analysis with Multiple Performance Objective Functions. 9th Structural Engineering Convention. 2014. New Delhi, India.
https://doi.org/10.1007/978-81-322-2187-6_194
15. Cheung, S.H. and S. Bansal, A Stochastic Simulation Algorithm for Updating Robust Reliability of Nonlinear Structural Dynamic Systems Based on Incomplete Modal Data. Second International Conference on Vulnerability and Risk Analysis and Management (ICVRAM2014) & Sixth International Symposium on Uncertainty Modelling and Analysis (ISUMA2014). 2014. Liverpool, UK: ASCE.
<https://doi.org/10.1061/9780784413609.158>
16. Bansal, S. and S.H. Cheung, Stochastic Simulation Based Reliability Analysis with Multiple Performance Objective Functions. International Symposium on Reliability Engineering and Risk Management. 2014. Taipei, Taiwan.
https://doi.org/10.1007/978-81-322-2187-6_194
17. Cheung, S.H. and S. Bansal, Stochastic Simulation Based Robust Reliability Updating of Nonlinear Structural Dynamic Systems Based On Incomplete Modal Data. International Symposium on Reliability Engineering and Risk Management. 2014. Taipei, Taiwan.
18. Cheung, S.H. and S. Bansal, Probabilistic seismic loss estimation by stochastic simulation algorithms. 11th International Conference on Structural Safety and Reliability. 2013. New York, USA.
<https://doi.org/10.1201/b16387-596>
19. Cheung, S.H. and S. Bansal, A Stochastic Simulation Algorithm for Bayesian Model Updating of Linear Structural Dynamic System with Non-Classical Damping. 11th International Conference on Structural Safety and Reliability. 2013. New York, USA.
<http://dx.doi.org/10.1201/b16387-278>
20. Cheung, S.H. and S. Bansal, A new stochastic simulation algorithm for updating robust reliability of linear structural dynamic systems. 11th International Conference on Structural Safety and Reliability. 2013. New York, USA.
<http://dx.doi.org/10.1201/b16387-281>
21. Cheung, S.H. and S. Bansal, A New Gibbs-Sampling Based Algorithm for Bayesian Model Updating of Linear Dynamic Systems with Incomplete Complex Modal Data. International Multi-Conference of Engineers and Computer Scientists. 2013. Hong Kong. (BEST PAPER AWARD).
22. Cheung, S.H. and S. Bansal, A stochastic simulation based approach for seismic loss analysis and probability function computation. 15th World Conference on Earthquake Engineering. 2012. Lisbon, Portugal.
https://www.iitk.ac.in/nicee/wcee/article/WCEE2012_5765.pdf
23. Bansal, S. and S.H. Cheung, Bayesian model updating of stochastic dynamic soil-structure interaction system with multiple resolutions. 10th World Congress on Computational Mechanics. 2012. Sao Paulo, Brazil.
<http://dx.doi.org/10.5151/meceng-wccm2012-19339>

Reviewer

Books

- AICTE Technical Book based on AICTE model curriculum “Testing and Evaluation of Civil Engineering Materials”.

Journals

- Structural and Multidisciplinary Optimization
- Advances in Structural Engineering
- Sādhanā
- Data-Centric Engineering
- Engineering and Computational Mechanics

Professional Recognition/Award/ Prize/ Certificate, Fellowship

- Keynote Presentation, 9th Structural Engineering Convention, New Delhi, India (2014)
- Best Paper Award, IAENG International Conference on Scientific Computing (2013)
- Research Scholarship, Nanyang Technological University Singapore (2010)
- Certificate of Appreciation, National Services Scheme, IIT Delhi (2009)
- Certificate of Outstanding Contribution to Board for Hostel Management, IIT Delhi (2008)

Fellowship / Professional Memberships

- Member, Institution of Engineers, IEI (India)
- Member, Indian Roads Congress (India)
- Member of American Concrete Institute (ACI)