

Sajal Kanti Deb

Contact Details:

Department Of Civil Engineering
IIT Guwahati, Pin – 781039, Assam
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Educational background:

PhD - Earthquake Engineering, University of Roorkee (presently, IIT Roorkee)	1994
MCE - Structural Engineering Jadavpur University	1986
BE - Civil Engineering REC Silchar (presently, NIT Silchar)	1984

Employment Details:

Professor – HAG, IIT Guwahati	2015– onward
Professor, IIT Guwahati	2008-2015
Associate Professor, IIT Guwahati	2003-2008
Assistant Professor, IIT Guwahati	2000-2003
Assistant Professor, NIT Silchar	1996-2000
Lecturer, NIT Silchar	1986-1996
Lecturer, BIT Mesra	1986-1986

Administrative positions:

1. Dean – Resource Generation & Finance: 2020-2021
2. Head – Department of Civil Engineering: 2009-2012
3. Chairman – Project Management Committee: 2007-2009
4. Chairman - GATE (IITG): 2004
5. Vice Chairman – GATE: 2002 and 2003
6. Chairman Sports – IITG: 2001 and 2002

In addition to the above mentioned major responsibilities, the applicant was part many committees as a member, Convener/ Chairman.

Research Interests:

Seismic Base Isolation and Passive Energy Dissipation Devices, Seismic Rehabilitation and retrofitting, Performance Based Seismic Engineering, Structural Health Monitoring

Research Awards:

1. **A.S. Arya - IIT Roorkee Research Award 2016 on *Disaster Prevention*** presented during institute convocation.
2. **Dr. Jai Krishna Medal** awarded in the 17th Engineering Congress organized by Institution of Engineers (India) during December, 2002.

Patents and Research Publications:

Patents:

1. Title of the invention: "Hybrid buckling restrained brace (HyBRB) with high damping capacity and manufacturing method thereof" Application no. 202131007188, 20-02-2021, Indian Patent No.: 508542, Grant Date: 08-02-2024
2. Title of the invention: "Elastomeric Seismic Isolation with High Damping Capacity and Manufacturing Method Thereof." Application No. 201631021115 A, Indian Patent No.:420434, Grant Date: 03-02-2023

Publications:

International Journals

1. Sarmah, M., Dutta, A., and **Deb, S. K.** (2024). Calibration of finite element model of bridge with pier retrofitted using Fe-SMA strips. *Bulletin of Earthquake Engineering*, Springer, 1-25. <https://doi.org/10.1007/s10518-023-01797-6>.
2. Sarmah, M., **Deb, S. K.**, and Dutta, A. (2024). Rehabilitation of Severely Damaged RC Bridge Piers: Experimental and Numerical Investigation. *Journal of Earthquake Engineering*, Taylor & Francis, 1-30. <https://doi.org/10.1080/13632469.2023.2259018>.
3. Sarmah, M., Dutta, A., and Deb, S.K. (2023) Axial Stress-Strain Model for Concrete Actively Confined with Fe-SMA Strips. *Journal of Materials in Civil Engineering*, ASCE, doi.org/10.1061/jmcee7/mteng-16087.
4. Das, P.J. and **Deb, S.K.** (2023), Experimental Study of Newly Developed Hybrid Buckling-Restrained Brace with Different Infill-Layer Geometries under Cyclic Loading, Practice Periodical on Structural Design and Construction, ASCE, DOI: 10.1061/PPSCFX.SCENG-1316.
5. Sarmah, M., **Deb, S. K.**, & Dutta, A. (2023). Hybrid Simulation for Evaluation of Seismic Performance of Highway Bridge with Pier Retrofitted Using Fe-SMA Strips. *Journal of Bridge Engineering*, ASCE, 28(8), doi.org/10.1061/jbenf2.beeng-6047.
6. Paul, S., **Deb, S.K.** and Rangoonwala, A.H. (2023) "Seismic performance of bidirectional bolted drilled cut RBS-CFT connections under cyclic loads", *Journal of Building Engineering*, Elsevier, doi.org/10.1016/j.jobe.2023.107185.
7. Paul, S. and **Deb, S. K.** (2023). "Seismic vulnerability assessment of exterior semi-rigid RBS-column connections using experimental fragility functions", *Innovative Infrastructure Solutions*, Springer Nature, Volume 8, Year 2023, doi: 10.1007/s41062-023-01100-1.
8. Das, G., Das, P.J., and **Deb, S.K.** (2023) "Seismic retrofit of torsionally coupled RC soft-storey building using short yielding core BRBs", *Journal of Building Engineering*, Elsevier, doi.org/10.1016/j.jobe.2022.105742.
9. Paul, P., Dutta, A. and **Deb, S.K.** (2022), "Comparison of the performance of nonlinear Kalman filter based algorithms for state-parameter identification of base isolated structures", *Journal of Structural Control and Health Monitoring*, Wiley Inter-Science, doi.org/10.1002/stc.3029.
10. Das, P.J. and **Deb, S.K.** (2022), Seismic performance evaluation of a new hybrid buckling restrained brace (HyBRB) under cyclic loading, *Journal of Structural Engineering*, ASCE, doi: [https://doi.org/10.1061/\(ASCE\)ST.1943-541X.0003372](https://doi.org/10.1061/(ASCE)ST.1943-541X.0003372).
11. Paul, S. and **Deb, S.K.** (2021), Experimental study on a new V-cut RBS and CFT connections with bidirectional bolts under cyclic loadings, *Journal of Building Engineering* (Elsevier), doi: <https://doi.org/10.1016/j.jobe.2021.103688>.
12. Borsakia, A.C., Dutta, A. and **Deb, S.K.** (2021), "Evaluation of participation of masonry infill walls in the linear and nonlinear behaviour of RC buildings with open ground storey", *Journal of Building Engineering*, Elsevier, doi: <https://doi.org/10.1016/j.jobe.2021.103263>.
13. Basar, T, **Deb, S.K.**, Das, P.J., and Sarmah, M. (2021), "Seismic response control of low-rise unreinforced masonry building test model using low-cost and sustainable un-bonded scrap tyre isolator (U-STI)", *Soil Dynamics and Earthquake Engineering*, Elsevier, doi.org/10.1016/j. soildyn.2020.106561.
14. Kotoky, N., Dutta, A. and **Deb, S.K.** (2020), "Hybrid Testing for evaluation of Seismic performance of highway bridge with pier made of HyFRC", *Structures* (Elsevier), Vol. 20, pp. 848-865.

15. Kotoky, N., Dutta, A. and **Deb, S.K.** (2019), "Comparative study on seismic vulnerability of highway bridge with conventional and HyFRC piers", *Bulletin of Earthquake Engineering*, Springer, Vol.17, pp. 2281-2306.
16. Kotoky, N., **Deb, S.K.** and Dutta, A. (2018), "Experimental studies on hyfrc bridge piers with different detailings at pier-foundation interface", *Journal of Bridge Engg*, ASCE, Vol. 23, No. 6, pp.
17. Ngo, T.V., **Deb, S.K.** and Dutta, A. (2018), "Mitigation of seismic vulnerability of a prototype low-rise masonry building using U-FREIs", *Journal of Performance of Constructed Facilities*, ASCE, Vol. 32, No. 2, pp.
18. Marthong, C., **Deb, S.K.** and Dutta, A. (2018), "Effect of loading rate on the epoxy repaired beam-column connections", *European Journal of Environmental and Civil Engineering*, (Taylor & Francis), Vol. 22, No. 10, pp. 1212-1237.
19. Ngo, T.V., Dutta, A. and **Deb, S.K.** (2017), "Evaluation of horizontal stiffness of fibre-reinforced elastomeric isolators", *Earthquake Engineering and Structural Dynamics* (Wiley Inter-Science), Vol. 46, pp. 1747-1767.
20. Ngo, T.V., **Deb, S.K.** and Dutta, A. (2017), "Effect of horizontal loading direction on performance of prototype square un-bonded fibre reinforced elastomeric isolator", *Journal of Structural Control and Health Monitoring*, (Wiley Inter-Science), doi: 10.1002/stc.2112.
21. Das, A., **Deb, S.K.** and Dutta, A. (2016), "Comparison of Numerical and Experimental Seismic Responses of FREI Supported Un-reinforced Brick Masonry Model Building", *Journal of Earthquake Engineering*, (Taylor & Francis), Vol. 20, pp. 1239-1262.
22. C. Marthong, A. Dutta and **S. K. Deb** (2016), "Effect of Cyclic Loading Frequency on the Behaviour of RC Beam-Column Connections", *Journal of Earthquake Engineering*, (Taylor & Francis), Vol. 20, pp. 1126-1147.
23. Das, A., **Deb, S.K.** and Dutta, A. (2016), "Shake table testing of unreinforced brick masonry building test model isolated by U-FREI", *Earthquake Engineering and Structural Dynamics* (Wiley Inter-Science), Vol. 45, pp. 263-272.
24. Marthong, C., Dutta, A. and **Deb, S.K.** (2016), "Study on size effect of RC and rehabilitated exterior beam-column connections under cyclic loading", *European Journal of Environmental and Civil Engineering*, (Taylor & Francis). Vol. 20, No. 5, 586–610.
25. Marthong, C., Dutta, A., and **Deb, S.K.** (2016), "Experimental Fragility Functions for Exterior RC Beam-Column Connections before and after Rehabilitation", *Earthquake and Structure*, (Techno Press, Korea), Vol. 10, No. 6, pp. 1291-1314.
26. Debnath, N., Dutta, A. and **Deb, S.K.** (2016), "Multi-Modal Passive-Vibration Control of Bridges under General Loading-Condition", *Procedia Engineering*, 144, 264 – 273 (2016).
27. Kheni, D., Scott, R.H., **Deb, S.K.** and Dutta, A. (2015), "Ductility enhancement in beam-column connections under cyclic loading using HYFRC", *ACI Structural Journal*, Vol. 112 (2), PP. 167-178. (American Concrete Institute).
28. Debnath, N, **Deb, S.K.** and Dutta, A.(2015), "Multi-modal vibration control of truss bridges with tuned mass dampers and general loading", *Journal of vibration and control*, DOI: 10.1177/1077546315571172 (Sage Publication).
29. Das, A., Dutta, A. and **Deb, S.K.** (2015), "Performance of fiber-reinforced elastomeric base isolators under cyclic excitation", *Journal of Structural Control and Health Monitoring*, (Wiley Inter-Science), Vol. 22(2), pp.197-220.
30. Erteleva, O., Aptikaev, F., Baruah, S., Baruah, S., **Deb, S.K.** and Kayal, J.R. (2014), "Seismic treatment for a maximal credible earthquake in Guwahati city area of northeast India region", *Natural Hazards*, (Springer), Vol. 70 (1), 733-753.
31. Debnath, N., **Deb, S.K.** and Dutta, A. (2013), "Frequency band wise passive control of linear time invariant structural systems with H^∞ optimization", *Journal of Sound and Vibration* (Elsevier), Vol. 332 (23), pp. 6044-6062.
32. Marthong, C., Dutta, A. and **Deb, S.K.**(2013), "Seismic rehabilitation of RC exterior beam-column connections using epoxy resin injection", *Journal of Earthquake Engineering*, (Taylor & Francis), Vol.17 (3), pp. 378-398.
33. Choudhury, A.M., **Deb, S.K.** and Dutta, A. (2013), "Study on size effect of FRP retrofitted RC beam-column connections under cyclic loading", *Canadian Journal of Civil Engineering* (NRC Press), Vol. 40 (4) pp. 353-360.
34. Nath, R.J., **Deb, S.K.** and Dutta, A. (2013), " Base isolated RC building – performance evaluation and numerical model updating using recorded earthquake response", *Int. Journal of Earthquakes and Structures* (Techno Press, Korea), Vol.4 (5), PP. 471-487.
35. Debnath, N., Dutta, A. and **Deb, S.K.** (2012), "Placement of sensors in operational modal analysis for truss bridges", *Mechanical System and Signal Processing* (Elsevier), Vol. 31, pp. 196-216.
36. Borsaikia, A.C., Dutta, A. and **Deb, S.K.** (2011), "System identification of multistoreyed non- standard shear building using parametric state space modeling", *Journal of Structural Control and Health Monitoring* (Wiley Inter-Science), Vol. 18 (4), pp. 471-480.

37. Scott, R.H., **Deb, S.K.** and Dutta, A. (2010), "Strain distribution in external reinforced concrete beam-column joint subjected to cyclic loading", **Concrete, Concrete Society, UK**, Vol. 44 (6), pp. 57-59.
38. Dutta, A., Dutta, A., and **Deb, S.K.** (2008), "Design of Active controller for Quincy Bayview Bridge, Illinois, USA against seismic excitation: Part I: Model updating", **Journal of Structural Control and Health Monitoring** (Wiley Inter-Science), Vol.15, pp. 1057-1077.
39. Dutta, A., **Deb S.K.** and Dutta, A. (2008), "Design of Active controller for Quincy Bayview Bridge, Illinois, USA against seismic excitation: Part II – Control implementation", **Journal of Structural Control and Health Monitoring** (Wiley Inter-Science), Vol.15, pp. 1078-1104.
40. Nath, S.K., Raj, A., Sharma, J., Thingbaijam, K.K.S., Kumar, A., Nandy, D.R., Yadav, M.K., Dasgupta, S., Majumdar, K., Kayal, J.R., Shukla, A.K., **Deb, S.K.**, Pathak, J., Hazarika, P.J., Paul D.K. and Bansal, B.K. (2008), " Site amplification, Q_s , and source parameterization in Guwahati region from seismic and geotechnical analysis", **Seismological Research Letters**, Vol.79, No.4, pp.526-539.
41. Medhi, M., Dutta, A., and **Deb, S.K.** (2008) "Health monitoring of multistoreyed shear building using parametric state space modeling", **Int. Journal of Smart Structures and Systems**, 4(1), pp.47-66. (Techno Press, Korea).
42. Desu, N.B., Dutta, A. and **Deb, S.K.** (2007) "Optimal assessment and location of tuned mass dampers for seismic response control of a plan-asymmetrical building", **Int. Journal of Structural Engineering and Mechanics**, Vol.26, No.4, pp.459-477. (Techno Press, Korea).
43. Desu N.B, **Deb S.K.** and Dutta, A. (2006), "Coupled tuned mass dampers for control of coupled vibrations in asymmetric building", **Journal of Structural Control and Health Monitoring** (Wiley Inter-Science), Vol.13, No.5, pp.897-916.
44. **Deb, S.K.**, Paul, D.K. and Thakkar, S.K.(1997). "Simplified Non-linear Analysis of Base Isolated Buildings subjected to General Plane Motion." **Engg. Computations, Int. Journal of Computer Aided Engineering and Software**, Vol.14, No. 5, pp.542-557.

National Journal:

1. Kotoky, N., Dutta, A. and **Deb, S.K.** (2020), "Mechanical Properties of hybrid fiber reinforced concrete with steel and polypropylene fibers", **Indian Concrete Journal**, Vol. 94(12), pp.29-37.
2. Choudhury, A.M., Dutta, A. and **Deb, S.K.** (2013), "Effective retrofitting of plain concrete elements using fibre reinforced polymer wrapping", **Journal of Structural Engineering**, 39 (6), pp. 687-694.
3. Laksmi, G.A., Dutta, A. and **Deb, S.K.** (2008), "Numerical studies of strengthening of beam-column joint under cyclic excitation using FRP composites" **Journal of Structural Engineering**, Vol.35, No.1, pp.59-65.
4. Dubey, P.N., Reddy, G.R., Vaze, K.K., Ghosh, A.K. Kushwaha, H.S., and **Deb, S.K.** (2008), "Performance of Base Isolated RCC Framed Building under actual Earthquake", **Journal of Structural Engineering**, Vol.35, No.3, pp.195-201.
5. Shinoj, A.K., **Deb, S.K.** and Dutta, A. (2008), "Influence of structural modeling on seismic vulnerability assessment of a railway overbridge using fragility curves" **Highway Research Bulletin, Indian Road Congress**, Vol. 69, No.1 (July-Dec).
6. **Deb, S.K.** and Borsaikia, A. (2006), "Design of mass concrete mix for gravity dam based on fineness modulus and geometrical gradation" **Indian Concrete Journal**, Vo.80, No.1, pp.52-56.
7. Deb, S.K. (2004), "Seismic base isolation – an overview", **Current Science**, Vol.87, No.10, pp.1426-1430.
8. Mathur, S. and **Deb, S.K.** (2003), "Seismic response control of reinforced concrete setback building with friction dampers" **Indian Concrete Journal**, Vol. 77(11), pp 1469-1472.
9. Choudhury, S. and **Deb, S.K.** (2001), "Dynamic Analysis of Buildings with Yielding Truss Elements of Bilinear Characteristics." **J. of Civil Engg. Div., Institution Engineers, India**, Vol.82, No.12, pp.131-135.

International Conferences:

1. Das, P.J., and Deb S. K., (2024). Seismic Vulnerability Reduction of a Soft Ground-Story RC Building with Open-Core BRBs, Proc. of 18th World Conference on Earthquake Engineering, Milan, Italy, Paper No. 2736.
2. Sarmah, M., Dutta, A. and Deb, S. K. (2024). Evaluation of seismic performance of highway bridge pier retrofitted using Fe-SMA strips. Material characterization of Fe-SMA strips for seismic

retrofitting application in RC bridge pier. Proc. of 18th World Conference on Earthquake Engineering, Milan, Italy, Paper No. 2359.

3. Basar, T. and Deb, S.K.,(2024), Simulation of force-displacement hysteretic behaviour of prototype PB-FREI, Proc. of 18th World Conference on Earthquake Engineering, Milan, Italy, Paper No.1139.
4. Das, P. J. and Deb S. K., (2023), Seismic Fragility Analysis of RC Building with Soft Ground Story Retrofitted Using Open Core-Hybrid BRB, *International Conference on Condition Assessment, Rehabilitation & Retrofitting of Structures (CARRS 2023)*, IIT Hyderabad
5. Sarmah, M., Deb, S. K., and Dutta, A. (2023). Material characterization of Fe-SMA strips for seismic retrofitting application in RC bridge pier. *Int. Conf. on Condition Assessment, Rehabilitation & Retrofitting of Structures*, IIT Hyderabad.
6. Das, P.J. and Deb S. K., (2023). Experimental study on open core hybrid buckling restrained braces with different debonding layer geometries, *Eurosteel 2023, Amsterdam*.
7. . Paul, S. and **Deb, S.K. (2023)**, “*Experimental study on radius cut RBS and CFT connection with bidirectional bolts under cyclic loads*,” Proceedings of 17th Symposium on Earthquake Engineering (Vol.2), Lecture Notes in Civil Engineering 330, Springer Nature Singapore Pte. Ltd., https://doi.org/10.1007/978-981-99-1604-7_2.
8. Rangoonwala, A.H., Paul, S. and **Deb, S.K. (2023)**, “*Numerical simulation of special moment resisting frame with and without RBS under cyclic load*,” Proceedings of 17th Symposium on Earthquake Engineering (Vol.3), Lecture Notes in Civil Engineering 331, Springer Nature Singapore Pte. Ltd., https://doi.org/10.1007/978-981-99-1579-8_19.
9. Basar, T. and Deb, S.K.,(2023), Determination of hyperelastic and viscoelastic properties of elastomer for simulation of force-displacement hysteretic property of UFREI, 13th Structural engineering Convention (SEC-2023) at VNIT, Nagpur, Paper No. 369
10. Deb, S. K., Sarmah, M. and Dutta, A. (2020). Active confinement for strength and ductility enhancement of concrete using Fe-SMA strips. *17th World Conference on Earthquake Engineering*, Sendai, Japan.
11. Thuyet V. Ngo, S.K. Deb* and Anjan Dutta, (2019), Effect of shear modulus and shape factor on the performance of prototype un-bonded fibre reinforced elastomeric isolators, Proc. of SEMC, Cape Town, Sep 2-4, Paper No. 220.
12. Das, P. J., Deb, S. K., (2018). Simplified Design of Open-core Buckling Restrained Brace for Enhancement of Damping. *16th Symposium on Earthquake Engineering, IIT Roorkee*, Paper ID: 253.
13. R.S. Verma, **S.K. Deb**, and A. Borsaikia (2017), Experimental study on seismic performance of external RC beam-column connections made using RCA, Proc. of 16th World Conference in Earthquake Engineering, Santiago, Chile, January 09-13, 2017. (Paper ID 1944).
14. Paul, P.K., Dutta, A. and **Deb, S.K.**(2015), “System identification and damage detection of RC structure”, Proc. of 5th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering at Crete Island, Greece, 25–27 May 2015.
15. Kansal, S. and **Deb, S.K.** (2013), “Shake table test of shear frame structure with elastomeric springs mounted tuned mass”, Proc. of VEESD 2013, Viena, Austria, August 28-30, 2013 (paper no. 126).
16. Debnath, N., **Deb, S.K.** and Dutta, A. (2012) “System Identification of the Saraighat Bridge using Ambient Vibration Data: A Case Study”, Proc. of 15th World Conference in Earthquake Engineering, Lisbon, Portugal, September 24-28, 2012. (Paper ID 1842).
17. Das, A., Dutta, A., and **Deb, S.K.** (2012), “Modeling of fiber-reinforced elastomeric base isolators” Proc. of 15th World Conference in Earthquake Engineering, Lisbon, Portugal, September 24-28, 2012. (Paper ID 1854).
18. Kheni, D.G., **Deb, S.K.**, and Dutta, A. (2011), “Studies on Toughness of Hybrid Fibre-Reinforced Cementitious Composite Beam” International Conference on Structural Engineering Construction and Management, Kandy, Sri Lanka, December 15-17, 2011.
19. Marthong, C., **Deb, S.K.**, and Dutta, A. (2011), “Performance of rehabilitated RC beam-column sub-assembly under cyclic loading”, Proc. of 36th Conference on Our World in Concrete & Structures, Singapore, August 14-16, 2011.

20. Kumar, K., Dutta, A. and **Deb, S.K.** (2010), "Multiple crack identification in a beam using genetic algorithm", Proc. of Tenth International Conference on Computational Structures Technology, Valencia, Spain, September 14-17, 2010.
21. Borsaikia, A.C., Dutta, A. and **Deb, S.K.** (2010), "Identification of influence of infill walls on lateral stiffness of rc framed structure", Proc. of 5th International Civil Engineering Conference (CECAR5) together with the Australasian Structural Engineering Conference (ASEC 2010), Sydney, August 8-12, 2010.
22. Choudhury, A.M., Dutta, A. and **Deb, S.K.** (2010), "Comparative study of full scale beam-column joints under cyclic loading", in the proceedings of 3rd International Earthquake Symposium, Dhaka, March 5-6, 2010.
23. Suresh, K., **Deb, S.K.**, and Dutta, A. (2008), "Parametric system identification of multistoreyed buildings with non-uniform mass and stiffness distribution", Proc. of 14th WCEE, Beijing, October 12-17, 2008, Paper ID: 05-01-0053.
24. Dutta, A., **Deb, S.K.**, and Dutta A. (2008), "Design of active controller for Bill Emerson memorial bridge, USA against seismic excitation using updated numerical model", Proc. of 14th WCEE, Beijing, October 12-17, 2008, Paper ID: 14-0286.
25. Debnath, N., **Deb, S.K.**, and Dutta, A. (2008), "Robust design of TMD for seismic response control of asymmetric soft storey buildings", Proc. of 14th WCEE, Beijing, October 12-17, 2008, Paper ID: 05-01-0045.
26. Suresh, K., **Deb, S.K.** and Dutta, A. (2007), "Studies on system identification of multistoreyed buildings based on strong motion data recorded in Guwahati City Region", Proc. of Int. Conference on Earthquake Hazards and Mitigation (EHAM-07), IIT Guwahati, December 7-8, 2007, pp. 150-154.
27. Nath, S.K., Thingbaijam, K.K.S., Raj, A., Shukla, K., Pal, I., Nandy, D.R., Yadav, M.K., Bansal, B.K., Shukla, A.K., **Deb, S.K.**, Pathak, J., Hazarika, P.J. and Paul, D.K. (2007), "Seismic Scenario of Guwahati City", Proc. of Int. Conference on Earthquake Hazards and Mitigation (EHAM-07), IIT Guwahati, December 7-8, 2007, pp. 210-219.
28. Dubey, P.N., Reddy, G.R., **Deb, S.K.**, Vaze, K.K., Ghosh, A.K. and Kushwaha, H.S. (2007), "Performance of base isolated RCC framed building under actual earthquake", Proc. of Int. Conference on Earthquake Hazards and Mitigation (EHAM-07), IIT Guwahati, December 7-8, 2007, pp. 521-529.
29. Kurian, S.A., **Deb, S.K.** and Dutta, A. (2006), "Seismic vulnerability assessment of a railway overbridge using fragility curves", Proc. of 2nd Indo-Taiwan Workshop on Seismic Evaluation and Retrofitting of RC buildings, Taipei, Oct. 11-12, 2006, pp.109-117.
30. **Deb, S.K.** and Geddani, V.K. (2006), "Pushover analysis of reinforced concrete buildings with flexible floor diaphragm" Proc. of 1st European Conference on Earthquake Engineering and Seismology, Geneva, Sept. 3-8, 2006, paper no.75.
31. Dutta, A., **Deb, S.K.** and Medhi, M. (2006), "Parametric system identification technique for damage detection of multistoreyed shear building" Proc. of 1st European Conference on Earthquake Engineering and Seismology, Geneva, Sept. 3-8, 2006, paper no.61.
32. Dutta, A.K., **Deb, S.K.** and Dutta, A. (2006), "Active control of a cable stayed bridge against multiple support seismic excitations", Proc. of 13th Symposium of Earthquake Engineering, held at IIT Roorkee, December 18-20, 2006.
33. Dutta, A. K., **Deb, S. K.** and Dutta, A. (2006), "Active control of cable stayed bridge against seismic excitation: a case study", Proc. of International Congress on Computational Mechanics and Simulation (ICCMS - 06) held at IIT Guwahati during December 8-10, 2006.
34. Dutta, A., **Deb, S.K.** and Desu, N.B.(2005), "Optimal design of bi-directional tuned mass dampers for seismic response control of asymmetrical building", Proc. 9th World Seminar on Seismic Isolation, Energy Dissipation and Active Vibration Control of Structures, Kobe, Japan (June 13-16).
35. **Deb, S.K.**, Dutta, A. and Desu, N.B. (2005), "Optimal design of coupled tuned mass dampers for seismic response control of asymmetric building", Proc. 9th World Seminar on Seismic Isolation, Energy Dissipation and Active Vibration Control of Structures, Kobe, Japan (June 13-16).
36. **Deb, S.K.** and Sateesh Kumar, G (2004), "Seismic damage assessment of reinforced concrete buildings using fuzzy logic", Proceedings of 13th World Conference on Earthquake Engineering, Vancouver, Paper ID 3098 (CD ROM).

37. **Deb, S.K.** and Sateesh Kumar, G. (2002). "Seismic Damage Assessment of Reinforced Concrete Buildings using Fuzzy Logic." Proc. Of 12th Symposium of Earthquake Engineering, IIT Roorkee, Vol.2, pp.1290-1297.
38. **Deb, S.K.**(2001). "Nonlinear Dynamic analysis of Buildings Supported by Pure-Friction Base Isolation System." First M.I.T. Conf. on Computational Fluid and Solid Mechanics, Cambridge, MA, USA.
39. **Deb, S.K.** and Paul, D.K.,(2000). "Seismic Response of Buildings Isolated by Sliding-elastomer Bearings Subjected to Bi-directional Motion." 12th World Conf. on Earthquake Engineering, Auckland New Zealand.
40. **Deb, S.K.** and Paul, D.K.,(1996). "Simplified Nonlinear Analysis of Base Isolated Building." Proc. of 11th World Conf. on Earthquake Engineering, Acapulco, Mexico, Paper No. 1344 (CDROM).
41. **Deb, S.K.**(1998). "Seismic Response of Buildings Supported by Pure-Friction Base Isolation System." Proc. of Int. Conf. ICTACEM-98, IIT Kharagpur, Paper No. 58(CDROM).
42. **Deb, S.K.** and Choudhury, S.(1998). "Design of Visco-elastic Dampers for Seismic Retrofitting of framed Structures." Proc. 11th Symposium on Earthquake Engineering, University of Roorkee.
43. Choudhury, S. and **Deb, S.K.**(1996). "Seismic Response of Buildings with Supplemental Damping Devices." Proc. of Int. Conf. on Disasters and Mitigation, Madras, pp. 174-185.
44. **Deb, S.K.**, Paul D.K. and Thakkar, S.K.(1994). "Seismic Response of Base Isolated R.C. Framed Structure." Proc. of 10th Symposium on Earthquake Engineering, University of Roorkee, Vol. 1, pp. 315-322.
45. **Deb, S.K.**, Thakkar, S.K. and Paul, D.K. (1990), "Design of laminated rubber bearing for 1/6th scale test model for shake table testing", Proc. of 9th Symposium on Earthquake Engineering, University of Roorkee, Vol. 1, pp. 215-224.

National Conferences:

1. Das, P. J., **Deb, S. K.**, (2022). Seismic Fragility Analysis of RC Building with Open Ground Story Retrofitted using HyBRB, *Proc. of Socio-Technological Aspects of Seismic Disaster and its Mitigation (STASDM)*, IIT Guwahati.
2. Sarmah, M., **Deb, S. K.**, and Dutta, A. (2018). Seismic rehabilitation of bridge pier using Fe-SMA: a review. *Civil Engineering for Sustainable Development-Opportunities and Challenges*, Assam Engineering College, Guwahati.
3. **Deb, S.K.** (2008), "Emerging Technologies for Earthquake Risk Reduction in Construction of Buildings", Proc. Conference on Managing Earthquake Risk, New Delhi, pp. 251-259.
4. **Deb, S.K.**, and Choudhury, S.(1997). "Seismic Response of Building with Friction Dampers." Proc. Structural Engineering Convention 1997, IIT Madras, pp.527-534.
5. Choudhury, S. and **Deb, S.K.**(1996). "WEBOPEN – software for Analysis of R.C. Beams with Web Openings." Proc. of First National Conf. on Computer Aided Structural Analysis and Design, Hyderabad.
6. **Deb, S.K.**, Thakkar, S.K. and Paul, D.K. (1990), "Design of laminated rubber bearing for 1/6th scale test model for shake table testing", Proc. of 9th Symposium on Earthquake Engineering, University of Roorkee, Vol. 1, pp. 215-224.

Book Chapters:

1. Sarmah, M., **Deb, S. K.**, & Dutta, A. (2022). Rapid Retrofitting of RC Columns Using Fe-SMA for Enhanced Seismic Performance. In *Theory and Practice in Earthquake Engineering and Technology* (pp. 211-232). **Springer, Singapore**, https://doi.org/10.1007/978-981-19-2324-1_8.
2. **Deb, S.K.** (2008), *Base Isolation and Energy Dissipation*, Chapter 14, Handbook on Retrofit of Reinforced Concrete Building, **Narosa Publication**. (Published at the joint initiative of IIT Madras and CPWD).

Sponsored R&D Projects:

Sl. No.	Project Title & Category	Sponsor	Project Grant (Rs)	Remarks
1.	<i>Experimental study on cyclic force-displacement characteristics of prototype U-FREI with and without rotation</i> Category: R&D, Status: ongoing	Arunachal Pradesh, PWD	32.20 lakhs	PI
2.	<i>Experimental study on seismic evaluation of performance of 3 storeyed test structure isolated by U-FREIs</i> Category: R&D, Status: ongoing	Arunachal Pradesh, PWD	2.0 lakhs	PI
3.	<i>Development of Prototype Buckling Restraint Braces (BRB) for seismic Response control of multistoreyed buildings</i> Category: R&D, Status: ongoing	Arunachal Pradesh, PWD	6.1 lakhs	PI
4.	<i>Ductility enhancement of bridge pier using HyFRC</i> Category: R&D, Duration: 3 years Status: Completed	DST, GOI	8 lakhs	Co-PI
5.	<i>Identification of building typology in NE India</i> Status: Completed in March, 2014	NDMA, GOI	23 lakhs	Co-PI
6.	<i>Study on role of hybrid fibres on strain distribution in RC beam-column connection subjected to cyclic loading</i> Category: R&D, Duration: 2 years Status: Completed in March, 2011	Royal Society, UK. (in collaboration with Durham University)	Grant through Durham University	PI
7.	<i>Verification test of a prototype base isolated three storeyed R.C.C. framed building subjected to actual earthquakes</i> Category: R&D, Duration: 3 years Status: Completed in March, 2007	BRNS, DAE, GOI, Mumbai	37.87 lakhs	PI
8.	<i>Studies on seismic behaviour of buildings with soft-storey based on dynamic testing</i> Category: R&D, Duration: 3 years Status: completed in March 2007	MHRD, GOI New Delhi	10.00 lakhs	PI
9.	<i>National Project on Earthquake Engineering Education (NPEEE)</i>	MHRD, GOI New Delhi	95.00 lakhs	PIC-Member, IITG

	Category: Joint Project of seven IITs & IISc Bangalore for capacity building in Earthquake Engineering Duration: 4 years Status: Completed in March 2007			
10.	<i>Design of a concrete dam under seismic excitation considering fluid-structure interaction</i> Duration: 3 years, Category: R&D Status: Completed in 2005	MHRD, GOI New Delhi	8.00 lakhs	Co-PI
11.	<i>Installation of strong motion array in Guwahati for site characterization and instrumentation of multistoreyed buildings at Guwahati</i> Duration: 3 years, Category: R&D Status: Completed	DST, GOI New Delhi	94.50 lakhs	PI
12.	<i>Verification test of prototype base isolated buildings subjected to dynamic loads</i> Duration: 3 years, Category: R&D Status: Completed	BRNS, DAE, GOI, Mumbai	8.63 lakhs	PI
13.	<i>Earthquake Protection of Buildings using Supplemental Damping Devices</i> Duration: 3 years, Category: R&D Status: Completed in 2000	AICTE, New Delhi	4.5 lakhs	PI

In addition to the above referred projects, the applicant was PI for FIST grant Rs. 2.5 Cr. during 2010-11 from DST, GoI to upgrade Dynamic Structural Test Facility at IIT Guwahati.

Further, the applicant also coordinated preparation of proposal of second FIST Grant of Rs. 2.30 Cr from DST, GoI during 2019-20 for creation of *Real time hybrid testing facility* at IIT Guwahati.

Course Development:

Coordinated revision of MTech (Struc. Engg.) Course structure during 2010-11.

Developed the course content of the following subjects:

- (1) CE 503 Structural Dynamics
- (2) CE 504 Advanced Structural Design
- (3) CE 511 Analysis and design of bridges
- (4) CE 606 Earthquake Engineering

Development of a state-of-the-art dynamic testing facility / earthquake simulator test facility at IIT Guwahati

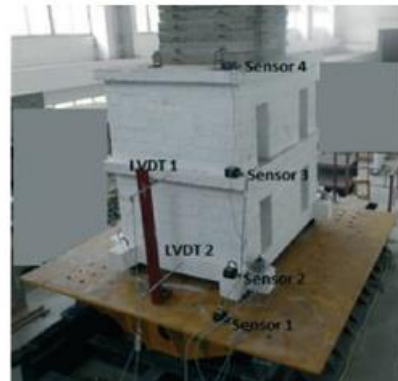
The applicant planned, designed and monitored construction of a state-of-the-art dynamic testing facility / earthquake simulator test facility at IIT Guwahati. Following major activities have been undertaken for creation of these facilities:

- Analysis, design and detailing of *Three Cell Strong floor (20m x 9m), Strong wall (9m x 6m and 10m x 6m)*
- Analysis, design and detailing of *Universal Loading Frame - 1000 kN capacity*
- Finalization specifications and procurement of *200 kN capacity EOT crane, 28m long Hydraulic Hard Line, Two Cooling Towers etc.*
- Finalization specifications and procurement of *Servo Hydraulic Actuators and Test Controller etc.*
- Finalization of specifications and installation of *Earthquake Simulator Testing Facility (Shake Table): 50 kN Payload, 2.5m x 2.5m*
- Finalization of specifications and installation of *Dynamic Data Acquisition System along with various types of Sensors, Loading Devices and Test Controller etc.*

Recently, **Hybrid Testing Facility**, an advance form of seismic testing protocol has been developed in the existing laboratory. Sample photographs of ongoing experimental programs are appended in the Fig 1. This modern test facility boasted high quality experimental research in the field of Earthquake Engineering at IIT Guwahati.



Cyclic load Test of RC Beam-column Connection



Shake table test of base isolated test model



Hybrid testing of bridge pier test model(HyFRC): A bird-eye view

Fig.1 Sample photographs of past test programs

Details of PhD Guidance:

Sl. No.	Student Name	Title of Thesis	Award Year
1.	Atanu Dutta	Updating of FE model of cable stayed bridges for improved dynamic characterization and active seismic response control implementation	2007
2.	Abdul Munim Choudhury	Study on size effect of RC beam-column joints with and without retrofitting under cyclic loading	2010
3.	Arun Chandra Borsaikia	Identification of system parameters of multi-storey buildings with limited sensors	2012
4.	Comingstarful Marthong	Experimental study on rehabilitated RC beam-column connections under cyclic loading	2012
5.	Nirmalendu Debnath	Operational modal analysis of an existing large truss bridge and passive vibration control using updated model	2014
6.	Animesh Das	Seismic response control of low-rise buildings using fibre-reinforced elastomeric isolator	2015
7.	Ngo Van Thuyet	Seismic performance evaluation of prototype unbonded fibre reinforced elastomeric isolators.	2017
8.	Needhi Katoky	Seismic performance evaluation of HyFRC bridge piers by hybrid simulation	2018
9.	Atop Lego	Seismic response control of integral abutment bridge using sleeved piles	2019
10.	Pradip Paul	Performance comparison of few selected algorithms for state and parameter estimation of multi-storeyed buildings	2021
11.	Pallab Jyoti Das	Seismic performance evaluation of a new inspectable hybrid buckling restrained brace	2023
12.	Subhra Paul	<i>Seismic performance evaluation of RBS-CFT connections with bidirectional bolts under cyclic loads</i>	2023
13.	Monjusha Sarmah	Hybrid simulation of retrofitted RC bridge with Fe-based shape memory alloy	2023

*Two more PhD students are working under my supervision.

Major Consultancy Projects:

Sl. No.	Client Organization	Type of Works / Status
1.	RVNL (Gol)	Proof checking of Detailed Design of structural work for the Construction of Ramp and Underground Metro Railway works from Mominpur (Ex.) to Esplanade, approx. 5.05 Km in connection with Joka - BBD Bag Metro Corridor, Kolkata, West Bengal. Status: Ongoing (Part of a four member team)
2.	AEGCL, (Govt. Of Assam)	Vetting of structural design and drawings of 4 nos. of 220KV sample transmission line towers of types - DA/DB/DC and DD. Status: Completed
3.	Assam PWD	Proof checking of structural design of the proposed Brahmaputra Bridge between Majuli on north bank and Jorhat on south bank (package II) on NH-715. Status: Ongoing (Part of a two member team)
4.	Assam PWD	Proof checking of technical aspect of DPR for construction of 4 lane Extradosed PSC Bridge over the river Brahmaputra connecting Palshbari and Sualkuchi under Assam Bridge Project – II. Status: Completed (Part of a three member team)
5.	Meghalaya PWD	Structural Assessment and Safety Audit of New Meghalaya Legislative Assembly Building (following collapse of central dome), Mawdiangdiang, New Shillong Status: Completed (Part of a two member team)
6.	Assam PWD	Checking efficacy of <i>Friction Pendulum Bearings</i> (Seismic Isolation Bearing) for seismic protection of the Brahmaputra Bridge (3 rd) Project at Guwahati Status: Completed
7.	RVNL	Proof checking of Detailed Design and drawings of structural works from Titurmir Station (Pier 760) to Airport station of New Garia-Airport Metro line-Kolkata. Status: Ongoing (Part of a three member team)
8.	NHAI, Gol	Proof checking of detail design and drawings of two tunnels at Chainage 138.476 m near Nrimbanglo (Tunnel -1) & 164.735 m near Jantinga (Tunnel -2) of NH-54 (E) in package AS-23 on East-West corridor project in Assam. Status: Completed (Part of a two member team)

9.	NF Railway	Instrumentation and testing of Saraighat bridge over the river Brahmaputra and Teesta Bridge at Jalpaiguri under NF Railway for structural health monitoring & fatigue life assessment. Status: Completed (Part of a two member team)
10.	Eastern Railway	Proof checking of structural design & drawing of New Jubilee Bridge over river Hoogly under Eastern Railway: Status: Completed (Part of a two member team)
11.	CPWD, Shillong	Failure analysis of RC Building (1 block) in BSF barrack in Shillong. Status: Completed (Part of a two member team)
12.	NRL, Numaligarh	NDT for critical machine foundations in Numaligarh Refinery Status: Completed (Part of a two member team)
13.	Reserve Bank of India, GOI	Seismic evaluation and retrofit design of the RBI building at Guwahati. Status: Completed (Part of a two member team)
14.	NHAI, GOI	Dynamic analysis and proof checking of structural design of 13 nos. of major continuous pre-stressed bridges. Status: Completed (Part of a two member team)
15.	PWD, Arunachal Pradesh	Dynamic analysis and checking of structural design of cable-suspended bridge (300 m single span) in Arunachal Pradesh Status: Completed (Part of a two member team)
16.	Assam Gas Company	Design of Foundation for Reciprocating Machine Status: Completed
17.	NHAI, GOI	Seismic design check/revision of design of 57 nos. of minor bridges under Bongaigaon PIU, NHAI. Status: Completed (Part of a two member team)
18.	BSNL, Shilong	Design of Communication Towers (roof top) Status: Completed (Part of a two member team)
19.	Mizoram PWD	Proof checking of 4 nos. major bridges of Kaladan multi-modal transit transport project. Status: Completed
20.	METCO Pvt. Ltd. Kolkata	Proof checking of design & detailing of Spherical Bearings for Katra-Quazikund Project Status: Completed

Short term course coordinated:

1. **NPEEE** sponsored short-term course on Earthquake resistant design of reinforced concrete buildings held at IIT Guwahati during July 7-13, 2003.
2. **UNDP-MHA** sponsored short-term course on State-of-practices in Earthquake Engineering held at IIT Guwahati during Jan.16-18, 2004.
3. **NPEEE** sponsored short-term course on held at IIT Guwahati during Dec 5-9, 2005.
4. **NPEEE** sponsored short-term course on held at IIT Guwahati during Nov.27-Dec 1, 2006.

Applicant had delivered many lectures as a resource person in various short term training programmes organized at IITG and at other institutes of national importance/ industries.

Conference organization:

Member of the organizing committee - International Workshop on Earthquake Hazard and Mitigation (EHAM 2007) held at IIT Guwahati during December 7-8, 2007.

BIS Guwahati Invited lecture on 14-10-2023:

Title of the presentation: *Technologies for Seismic Resilience of Structures on World Standard Celebration*

Membership of Professional Societies:

1. Member - Indian Society of Earthquake Technology
2. Member - Institution Engineers India

Other Recognitions:

1. Member Editorial Panel: *Structures and Buildings* – a Journal of Institute of Civil Engineers, UK during 2011-2016.
2. Member Editorial Board: *ISET Journal* – Journal of Indian Society of Earthquake Technology – 2015 onward.
3. Member – Program Implementation Committee: *National Program on Earthquake Engineering Education (NPEEE)* – a joint project implemented by 7 IITs and sponsored by MHRD, Gol.
4. Member – *Expert Committee on Seismic Retrofitting of Buildings*, NDMA, Gol.
5. Members of committees on Seismic Resilience formed by ASDMA, Govt. of Assam.
6. Reviewer of *Draft code for Ductile Detailing of RC Structure* – An initiative of IIT Kanpur – GSDMA.
7. **Delivered number of invited lectures in the Institution of international and national importance** including ELSA Ispra Italy, Saitama University Japan, NCREE Taipei, Durham University, UK, IISc Begalore, IIT Bombay, IIT Delhi, IIT Madras, IIT Guwahati, IIT Roorkee, IIT Hyderabad, IIT Mandi, NDMA, ASDMA, BARC, Jadavpur University, IEST Shibpur, CoE Pune, BIS Guwahati, many NITs and others reputed institutions.