VISHWAS N. KHATRI

Associate Professor,
Dept. of Civil Engineering
Indian Institute of Technology (ISM),
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Academic Qualifications

Ph.D- Geotechnical Engineering in 2009 from Indian Institute of Science, Bengaluru. Karnataka

M.Tech-Geotechnical Engineering in 2005 from Indian Institute of Science, Bengaluru. Karnataka

B.Tech-Civil Engineering in 2001 from Walchand Institute of Technology, Solapur (Shivaji University, Kolhapur) Maharashtra.

Details of Employment

Research Associate, Department of Civil Engineering, Indian Institute of Science Bangalore, India, August 2009-August 2010.
Assistant Professor, Walchand Institute of Technology, August 2010-April 2012
Assistant Professor, National Institute of Technology, Hamirpur, May-2012-Sept 2016
Assistant Professor, Indian Institute of Technology (ISM), Dhanbad, Sept 2016-2024

Associate Professor, Indian Institute of Technology (ISM), Dhanbad, 2024-till date

Research Interest

Upper and lower bound finite elements limit analysis, Numerical and Experimental modeling of Geomechanics problems, and Soil dynamics.

Teaching Experience

Under Graduate Courses
Design of foundations
Geotechnical Engineering –I and II
Geosynthetics
Ground Improvement Techniques
CPM and PERT
Construction Planning and Management
Rock Mechanics
Foundation Engineering
Construction Planning and Management
Computer Aided Design

Post Graduate Courses

Finite Element Method
Advanced Soil Mechanics
Earth pressure and Retaining structures
Optimization Techniques
Exploration and Field Testing
Advanced Foundation Engineering
Slope and Retaining Structures

Laboratory Experience

Soil mechanics Lab
Advanced Soil Mechanics Lab
Computational Lab

Research Guidance

Sr. No	Student Name	Title	Sole/Shared	Year and Status
1.	Pragyan Paramita Das	Bearing Capacity Estimation of Ring Footing on Layered Sand	Sole	Completed in 2022
2.	Ajay Kumar	Compression and Uplift Capacity Estimation of Under-reamed Piles in Clay and Sand	Principal Supervisor	Completed in 2022
3.	Sivani Remash T.	On the Application of the Method of Horizontal Slices for Static and Seismic Geotechnical Stability Problems	Sole	Ongoing
4.	Subham Jena	Bearing Capacity Improvement of Shallow Foundations using Treated Sisal Fibres/Geotextiles	Principal Supervisor	Ongoing
5.	Subodh Chakraborty	Experimental and Numerical Study on the Seepage and Stability Analysis of Rockfill Dams	Co-supervisor	Ongoing

ME/M.Tech Dissertations

Guided – 16

Ongoing - 2

List of Publications

(I) International Journals

1. Kumar J, **Khatri, VN.** (2008). "Effect of footing width on Nγ." Canadian Geotechnical journal, 45, 1673-1684. (SCIE, Q2 Citations: 36)
2. Kumar J, **Khatri, VN**. (2008). "Effect of footing width on bearing capacity factor Nγ for smooth strip footings." Journal of Geotechnical and Geoenvironmental Enginnering ASCE, 134(9), 1299-1310. (SCIE, Q1 Citations: 61)
3. Kumar J, **Khatri, VN.** (2008). "Effect of footing roughness on lower bound Nγ values." International Journal of Geomechanics ASCE, 8(3), 176-187. (SCIE, Q2 Citations: 69)
4. **Khatri, VN**, Kumar, J. (2009). "Bearing Capacity Factor Nγ for a Rough Conical Footing." Geomechanics and Engineering, 1 (3), 205-218. (SCIE, Q2 Citations: 18)
5. **Khatri, VN**, Kumar, J. (2009). "Vertical uplift resistance of circular plate anchors in clay under undrained condition." Computers and Geotechnics, 36 (8), 1352-1359. (SCIE, Q1 Citations: 61)
6. **Khatri, VN**, Kumar, J. (2009). "Bearing capacity factor Nc under $\phi = 0$ for piles in clays." International Journal for Numerical and Analytical Methods in Geomechanics, 33(9), 1203-1225. (SCIE, Q1 Citations: 47)
7. **Khatri, VN**, Kumar, J. (2010). "Stability of an unsupported vertical circular excavation in clays under undrained condition" Computers and Geotechnics, 37 (3), 419-424. (SCIE, Q1 Citations: 47)
8. **Khatri, VN**, Kumar, J. (2011). "Effect of anchor width on pullout capacity of strip anchors in sand." Canadian Geotechnical Journal, 48 (3), 511-517. (SCIE, Q2 Citations: 44)
9. **Khatri, VN**, Kumar, J. (2011). "Uplift capacity of axially loaded piles in clays" International Journal of Geomechanics ASCE, 11(1), 23-28. (SCIE, Q2 Citations: 35)

10. Kumar, J, **Khatri, VN.** (2011). "Bearing Capacity Factors of Circular Foundations for a General c−ϕ soil using Lower Bound Finite Element Limit Analysis" International Journal for Numerical and Analytical Methods in Geomechanics, 35(3), 393-405. (SCIE, Q1 Citations: 92)
11. Dutta R.K., **Khatri V.N**, Gayathri V (2012). "Effect of Addition of Treated Coir Fibres on the Compression Behaviour of Clay" Jordan journal of Civil Engineering, 6(4),476-484. (ESCI, Citations: 53)
12. RB Hiremath, R Kattumuri, B Kumar, **VN Khatri**, SS Patil (2012). "An integrated networking approach for a sustainable textile sector in Solapur, India" Urbani izziv, 140-151 (ESCI, Citations: 14)
13. **Khatri V.N.**, Dutta R.K., Venkataraman G and Srivastava R. (2016), "Shear Strength Behaviour of Clay Reinforced with Treated Coir Fibres" Periodica Polytechnica Civil Engineering, 60(2) 135-143. (SCIE, Q4 Citations:24)
14. A Gupta, RK Dutta, R Shrivastava, **Khatri V.N.** (2017) "Ultimate Bearing Capacity of Square/Rectangular Footing on Layered Soil" Indian Geotechnical Journal 47 (3), 303-313. (ESCI, Citations: 19)
15. Dutta R.K. **Khatri V.N.** and Panvar V. (2017) "Strength Characteristics of Fly Ash Stabilized with Lime and Modified with Phosphogypsum" Journal of Building Engineering, 14, 32-40. (SCIE, Q1 Citations:24)
16. **Khatri V.N.**, Kumar J., Akhtar S. (2017) "Bearing Capacity of Foundations with an Inclusion of Dense Sand Layer over Loose Sand Strata" International Journal of Geomechanics, ASCE, 17 (10), 06017018 (SCIE, Q2 Citations:30)
17. **Khatri V.N.**, Debbarma S.P., Dutta R.K. and Mohanty B., (2017), "Pressure-settlement Behavior of Square and Rectangular Skirted Footings Resting on Sand" Geomechanics and Engineering, 12(4), 689-705. (SCIE, Q2 Citations:39)
18. Gnananandarao T., **Khatri V.N.**, Dutta R.K. (2018) "Performance of Multi-Edge Skirted Footings Resting on Sand" Indian Geotechnical Journal, 1-10. (ESCI, Citations: 20)
19. **Khatri V.N.**, Kumar J. (2019) "Finite elements limit analysis of strip and circular skirted footings on sand" International Journal of Geomechanics, ASCE, 19(3): 06019001. (SCIE, Q2 Citations:24)

20. **Khatri V.N.** (2019) “Determination of passive earth pressure with lower bound finite elements limit analysis and modified pseudo-dynamic method” Geomechanics and Geoengineering, https://doi.org/10.1080/17486025.2019.1573324 (Citations: 12)
21. Kumar A, **Khatri V.N.**, Gupta S.K. (2020) “Effect of linearly increasing cohesion on the compression and uplift capacity of the under-reamed pile in clay” S.N. Applied Sciences, 2(2), 315 (Citations: 11)
22. Gnananandarao T., Dutta R.K., **Khatri V.N.** (2020) “Model studies of plus and double box shaped skirted footings resting on sand” International Journal of Geoengineering, 11, 1-17. (ESCI, Citations: 11)
23. Gnananandarao T., Dutta R.K., **Khatri V.N.** (2020) “Bearing capacity and settlement prediction of multi-edge skirted footings resting on sand” Ingeniería e Investigación 40 (3), 9-21. (SCIE, Q4 Citations: 12)
24. Das P.P., **Khatri V.N.**, Dutta R.K. (2021) “ Bearing capacity of ring footing on weak sand layer overlying a dense sand deposit” Geomechanics and Geoengineering. 1-14. (Citations: 17)
25. **Khatri V.N.**, Kumar A, Gupta S.K. (2022) “Numerical and analytical study on uplift capacity of under-reamed piles in sand” Marine Georesources & Geotechnology, 40(1), 104-124 (SCIE, Q2 Citations: 8)
26. **Khatri V.N.**, Kumar A, Gupta S.K., Dutta R.K., Gnananandarao T. (2022) “ Numerical study on the uplift capacity of under-reamed piles in clay with linearly increasing cohesion” International Journal of Geotechnical Engineering. 1-12. (Citations: 12)
27. **Khatri V.N.**, Kumar J., Das P.P. (2022) “Bearing capacity of ring footings placed on dense sand underlain by loose sand layer” European Journal of Environmental and Civil Engineering” DOI: 10.1080/19648189.2020.1805643 (SCIE, Q2 Citations: 10)
28. **Khatri V.N.**, Nainegali L., Sarkar R., Das S.K. (2022) “Assessment of overburden dump and highwall slope stability for Jambad open cast coal mine, West Bengal, India, using in situ and laboratory testing.” Current Science, 123(2),184-196. (SCIE, Q3)

29. Dutta R.K., **Khatri V.N.**, Hamdani D.N. (2022) "Bearing capacity of skirted ring footing on soft clay overlying dense sand" Innovative Infrastructure Solutions, 7, 319.
30. Das P.P., **Khatri V.N.** (2022) "Bearing capacity prediction of strip and ring footings embedded in layered sand" Proceedings of the Institution of Civil Engineers-Geotechnical Engineering, 1-18. (SCIE, Q3)
31. **Khatri V.N.**, Yadav J. S., Srivastava K. (2022) "Numerical Estimation of Bearing Capacity of Conical Footing Embedded in Sand" Transportation Infrastructure Geotechnology, 1-22.
32. Angurana D.I., Yadav J.S., **Khatri V.N.** (2023) "Estimation of Uplift Capacity of Helical Pile Resting in Cohesionless Soil" Transportation Infrastructure Geotechnology, 1-32.
33. **Khatri V.N.**, Singh N., Dutta R.K., Yadav J.S. (2023) "Numerical estimation of bearing capacity of shallow footings resting on layered sand" Transportation Infrastructure Geotechnology, 10 (4), 707-731.
34. **Khatri V.N.**, Yadav J.S., Sundriyal S. (2023) "Mobile application development for estimation of permissible load on shallow and deep foundation using SPT data" Smart Construction and Sustainable Cities 1 (1), 10.
35. Jena. S, **Khatri V.N.**, Nainegali L., Dutta R.K. (2023) "Effect of chemical treatment on physical, mechanical, and morphological characteristics of sisal geotextile" The Journal of The Textile Institute, 1-17
36. Das P.P., **Khatri V.N.**, Lai V.Q., Keawsawasvong S. (2023) "Bearing Capacity Estimation of Ring Footing on Layered Sand with Geogrid at the Interface Using FELA and MARS" International Journal of Geosynthetics and Ground Engineering 9 (5), 57.
37. Thottoth S.R., **Khatri V.N.**, Kolathayar S., Keawsawasvong S., Lai V.Q. (2024) "Optimizing seismic earth pressure estimates for battered retaining walls using numerical methods and ANN" Geotechnical and Geological Engineering, 1-23.
38. Thottoth S.R., Das P.P., **Khatri V.N.** (2024) "Prediction of compression capacity of under-reamed piles in sand and clay" Multiscale and Multidisciplinary Modeling, Experiments and Design, 1-17.

39. Jena. S, Khatri V.N., Nainegali L., Dutta R.K. (2023) "Study on Physical, Mechanical, Morphological, and Crystallographic Properties of Chemically Treated Sisal Fibers" Fibers and Polymers, 1-18
40. Thottoth S.R., **Khatri, V.N.** (2024) "Bearing Pressure Assessment of Shallow Foundation on Coal Mine Overburden Dump with Spatial Variability Considerations" Indian Geotechnical Journal, 1-15
41. Thottoth S.R., **Khatri, V.N.** (2024) "Analytical and ANN-based models for assessment of hunchback retaining walls: Investigating lateral earth pressure in unsaturated backfill" Geomechanics and Engineering 38 (3), 285.

(II) National Journals

1. **Khatri, V.N.,** Kumar, M. and Dutta, R.K. (2016)," Effect of chemically treated coir fibres on the strength characteristics of clay", Indian Journal of Geosynthetics and Ground Engineering, 5(1), 11-23.

2. G. Lavanya, **Khatri, V.N.**, Dutta, R.K (2016), "Effect of stabilised granular column on the pressure settlement behaviour of clay", Indian Journal of Geosynthetics and Ground Engineering, 5(2), 3-15.

(III) Conference Papers

International

Khatri, VN, Kumar, J, and Kouzer KM. (2008). "Determination of the Bearing Capacity Factor N_γ Using Upper and Lower Bound Limit Analysis including Slip Line Method." *Proceedings 12th International Conference of International Association for Computer Methods and Advances in Geomechanics (IACMAG),* Goa, India.

National

1. **Khatri, VN**, Kumar, J. (2008). "Determination of the Bearing Capacity Factor Nγ Using Numerical Lower Bound Limit Analysis." Proceedings Indian Geotechnical Conference (I.G.C. 2008), Bangalore, India.

2. Dutta R.K. **Khatri V.N.** and Venkataraman G (2013)," Compaction and CBR behaviour of Clay reinforced with CCl_4 Treated Coir Fibres," International Conference on Intelligent Society in Pursuit of Advances of Civil Engineering, Gurgaon, India, 4-5 March.
3. Dutta R.K. **Khatri V.N**. and Venkataraman G (2013), "Compaction and CBR behaviour of Clay reinforced with NaOH Treated Coir Fibres," National Conference on Geotechnical and Geoenvironmental Aspects of Wastes and Their Utilization in Infrastructure Projects, Ludhiana, India, 15-16 February, 430-438.
4. Gnananandrao, T, Dutta R.K., **Khatri V.N.** (2016). "Application of Artificial Neural Network to Predict the Settlement of Foundations on Cohesionless Soils" Proceedings Indian Geotechnical Conference (I.G.C. 2016), Chennai, India
5. Das P.P., **Khatri V.N**. (2018), "Bearing capacity estimation of shallow foundations on dense sand underlain by loose sand strata using finite elements limit analysis" *Proceedings Indian Geotechnical Conference (I.G.C. 2018),* Bengaluru, India 13-15 Dec 2018.
6. Kumar J., **Khatri V.N**., Kumar A. (2020), "Performance of skirted and embedded circular footing on sand" *Second ASCE India Conference on "Challenges of Resilient and Sustainable Infrastructure Development In Emerging Economics" (CRSIDE 2020) Kolkata, March 2-4, 2020.*
7. Das P.P., **Khatri V.N**. (2020), "Bearing capacity estimation of ring footing on layered sand with geogrid at the interface" *Second ASCE India Conference on "Challenges of Resilient and Sustainable Infrastructure Development In Emerging Economics" (CRSIDE 2020) Kolkata, March 2-4, 2020.*
8. Thottoth S.R., Khatri, V.N. (2022), "Numerical Study on Sheet Pile Walls as Landslide Barrier" *Proceedings of the Indian Geotechnical Conference 2022 Volume 10: Geotechnics: Learning, Evaluation, Analysis and Practice (GEOLEAP), 15th – 17th December, 2022, Kochi*
9. Jena. S, Khatri V.N., Nainegali L. (2022), "A Study on Tensile Properties of Emulsion Coated Sisal Geotextile*" Proceedings of the Indian Geotechnical Conference 2022, 15th – 17th December, 2022, Kochi*

(IV) Book Chapters

1. Gnananandrao, T, Dutta R.K., **Khatri V.N.** (2018). "Application of Artificial Neural Network to Predict the Settlement of Foundations on Cohesionless Soils" Geotechnical Applications Lecture Notes in Civil Engineering, vol 13. Springer, Singapore.
2. Das P.P., **Khatri V.N.** (2020). "Bearing Capacity Estimation of Shallow Foundations on Dense Sand Underlain by Loose Sand Strata Using Finite Elements Limit Analysis" *Construction in Geotechnical Engineering, Proceedings of IGC 2018*
3. Kumar A, **Khatri V.N.**, Gupta S.K. (2020). "Uplift Capacity Determination for an Under-Reamed Pile in Non-homogeneous Clay" Advances in Offshore Geotechnics, 337-345, Springer, Singapore.
4. Das P.P., **Khatri V.N.** (2021). "Bearing Capacity Estimation of Shallow Foundations on Layered Sand Strata Using Finite Elements Analysis" Proceedings of the Indian Geotechnical Conference 2019, IGC-2019 Volume V
5. Gnananandrao, T, Dutta R.K., **Khatri V.N.** (2021). "Neural Network Based Prediction of Cone Side Resistance for Cohesive Soils" Lecture Notes in Civil Engineering, DOI: 10.1007/978-981-33-6466-0_36
6. Gnananandrao, T, Dutta R.K., **Khatri V.N.** (2021). "Tsunamigenic Seismic Activity (Earthquakes) Prediction from III- Component Seismic Data" Seismic Hazards and Risk DOI: 10.1007/978-981-15-9976-7_31
7.

Project Details

1. **Title of Project**: Slope stability study of existing dumps and quarry related to mining leasehold for iron ore namely Patabeda iron and Manganese mine over 19.425 Ha in village Patabeda in Koida Tahasil of Sundargarh district, Odisha (**PI**)
   Amount: Rs. 1150500.00/-
   Funding Agency: M/s M.G. Mohanty, Odisha
   Status: Completed

2. **Title of Project**: Dump bearing strength analysis (**PI**)
   Amount: Rs. 682748.00 /-
   Funding Agency: TATA STEEL LIMITED

Status: Completed

3. **Title of Project**: Feasibility study for construction of 10 MTPA Washery on OB Dump from structural strength and stability perspective. (**PI**)
   Amount: Rs. 493240.00/-
   Funding Agency: TATA STEEL LIMITED
   Status: Completed

4. **Title of Project**: Performance Evaluation of Soil for Embankment and Blanketing (Moorum and soil) for Railway siding formations works at 3x800MW PVUN (phase - I) Patratu, Ramgarh (**Co-PI**)
   Amount: Rs. 441320.00/-
   Funding Agency: Bharat Heavy Electricals Limited
   Status: Completed

5. **Title of Project**: Scientific study on stability of proposed diversion of Bokkalavagu nallah over goaved out Longwall Panels of GDK-10 Incline on the surface and assessment of Impact of blasting in RG OCP-I on embankment of proposed divertion nallah and assessment of water danger to Adriyala Longwall Project, RG OCP-I Expansion. (**Co-PI**)
   Amount: Rs. 973500.00/-
   Funding Agency: Singareni Collieries Company Limited
   Status: Completed

6. **Title of Project**: Scientific study of ultimate slope of pit and dumping slope stability of working of Jambad OCP, Kajora Area, ECL (**Co-PI**)
   Amount: Rs. 08,26,000/-
   Funding Agency: Eastern Coalfields Limited
   Status: Completed
7. **Title of Project**: Numerical and experimental study on the performance of embedded skirted footings in sand
   Amount: Rs. 10,00,000/-
   Funding Agency: FRS (IIT(ISM), Dhanbad
   Status: Completed

<u>Consultancy projects</u>

1. **Title of Project**: Soil Testing at 3 × 800 MW PVUN (Phase-1) Patratu, Ramgarh (PI)
   Amount: Rs. 1,29,000/-
   Funding Agency: Patratu Vidyut Utpadan Nigam Limited (PVUN), Jharkhand
   Status: Completed
2. **Title of Project**: Comprehensive Hydrological Study to assess the Impact of Nalas and Damodar River on Kalyaneswari Tasra Mining Pvt. Ltd. (KTMPL) Mining, (Co-PI)

Amount: 1,77,00,000/-
Funding Agency: M/s Kalyaneswari Tasra Mining Pvt. Ltd. (KTMPL), Dhanbad
Status: Ongoing

3. **Title of Project**: Evaluation of Raw Materials & Concrete Mix Design for M25 Grade Concreting Work (Co-PI)

Amount: 2,36,000/-
Funding Agency: M/s SMS India Pvt. Ltd. Gurugram
Status: Completed

4 **Title of Project**: Consultancy Work for Detailed Study of Ash Pond for Structural Strengthening and Modernization of Ash Dykes
Amount :25,46,440/-
Funding Agency: Bokaro Power Supply Corporation Limited
Status : Ongoing

Awards and Scholarships

- Recipient of N.S. Govind Rao gold medal for best student in Civil department during Masters Program (Aug -2005)
- Recipient of Ministry of Human Resource Development, Govt. of India scholarship during doctoral study.