

Curriculum vitae

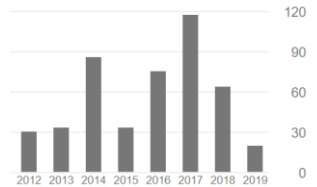
Vikas Thakur



Nationality:	Norwegian (Origin: India)
Age:	39 years
Current Positions:	Department head Professor (Geotechnical Engg.) Department of Civil and Env. Engineering, Norwegian University of Science and Technology (NTNU)
Education:	PhD (geotechnical), 2007, NTNU
Mobile:	+ 47 412 95 717
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Sittert av VIS ALLE

	Alle	Siden 2014
Sitater	552	400
h-indeks	13	11
i10-indeks	17	15



Short bio-data

- Over 80 published peer reviewed journal and conference papers.
- Citation Statistics (Last updated on April 12, 2019: Vikas Thakur 's Google Scholar page. **Citations: 400 since 2014. Published items:** A book on landslides in sensitive clays, 20 in peer reviewed journals, 60 book chapters and conference proceedings, **h-index 11**).
- Leader for NTNU's initiative to establish SFI on Water Infrastructure (Since 2017).
- Awarded Norconsultpris (åretsprofessor) during BM-Dagen in 2018.
- Active expert/reviewer for Horizon 2020
- Coordinator of a Horizon 2020 project proposal (single stage – call: SU INFRA) to be submitted in August this year.
- Leader of national project(s) to develop MOOC on Flexible learning in geotechnical Engineering (2015-2017) funded by Norgesuniversitet (now DiKU). The project has over 14 partners from academia, industries and public sectors.
- Appointed member of the tribunal for natural hazards fund (*naturskadefond*) since 2015.
- Appointed member of Natural hazards forum (since 2017) Norwegian Water Resources and Energy Directorate. The forum consists of Directorates for Roads, Railways, Civil Protection in addition to municipalities and the police etc.
- Editorial board member/Associate Editor of journals. Active participation in committee work, session chair in international conferences/workshops, invited lectures/key notes.
- Chair of the 2nd International workshop on landslides in sensitive clays was held in June 2017. Edited a book "landslides in sensitive clays: From research to implementation" published by Springer.

JOB EXPERIENCES

Year	Job title	Institution
2019 - onwards	Department head	Department of civil and Env. Engg NTNU, Norway
2015 - onwards	Professor	NTNU, Norway
Aug. 2013- Dec. 2015	Adjunct Professor (20%)	Aalesund University College (now NTNU)
July. 2012- July. 2013	Adjunct Associate Professor (20%)	Aalesund University College (now NTNU)
Jan. 2011-Dec. 2014	Chief Geotechnical Engineer	Norwegian Directorate of Roads
May 2009 –Dec. 2011	Senior Engineer	Norwegian Roads Authority

May 2009 –July 2012	Special Advisor (<i>external</i>)	SINTEF, Trondheim
Jan. 2008 -April 2009	Scientist	SINTEF, Trondheim
Jan. 2009 -June 2009	Guest Lecturer	University Centre in Svalbard
Jan. 2004 -Dec. 2007	Stipendiat (Geotechnical) (25%)	NTNU, Trondheim
April 2003 -Dec. 2003	Geotechnical Engineer (Machine foundation)	Bharat Heavy Electrical Limited, India
Aug. 2001 -Feb. 2003	Tutor (25%)	Indian Institute of Technology, Bombay, India

OFFICIAL APPOINTMENTS, AWARDS AND FELLOSHIPS

Year	Roll	Institution
2010 –	Expert Advisory Member INDNOR	Research Council of Norway
2017-	Leader NTNUs initiative on SFI:WIN	Department of Civil and Environmental Engineering
2018	NorconsultPris åretsprofessor – IBM v/NTNU	Awarded by Norconsult on BM-dagen
2017 -	Member Natural hazard damage commission	Norwegian Ministry for Agriculture
2017-	Member, Natural Hazards forum	Norwegian Water Resources and Energy Directorate
2012- 2016	Member of committee for Eurocode 7 - SN/ k066 – geotechnical evaluations	Standard Norway
2016	GIAN (Global Initiative for Academic Networks) Fellowship for NIT Hamirpur	Ministry of Education (MHRD) India
2015	JSPS-Fellowship Kyoto University	Japanese Society for Promotion of Sciences
2015	GIAN (Global Initiative for Academic Networks) Fellowship for NIT Raipur	Ministry of Education (MHRD) India
2012-2014	Leader, R&D programme landslide challenges in sensitive soft clays A National R&D program on Natural Hazards-Infrastructure, Flood and Slide” www.naturfare.no	By Norwegian Water Resources and Energy Directorate (NVE), Norwegian National Railways Administration (NNRA) and NPRA

2012-2014	Leader of the governing board of Geotechnical Association in Trondheim	Geotechnical Association in Trondheim
2011-2012	Participant – Global Future Leader development program by NHO. Courses at the Norwegian Business	The confederation of Norwegian Enterprise (NHO)
2008- 2011	Project Coordinator BILAT-INDIA Project funded by the Research Council of Norway	SINTEF Building and Infrastructure

EDITORIAL AND REVIEW WORK

- Associate Editor (2014-2016) of the International Journal- Environmental Geotechnics by the ICE publishing house. (<http://www.icevirtuallibrary.com/content/serial/envgeo>)
- Editorial Board Member (since 2016-): Indian Geotechnical Journal
- Editor – a book on Landslides in sensitive clays: from research to implementation by Springer book serier. June 2017.
- Editor - Conference proceeding on “Landslide in sensitive clays – A national level initiative» (Kvikkleire- en nasjonal satsing på sikkerhet i kvikkleireområder”) in 2012 Trondheim, Norway ISBN- 978-82-410-0821-4 (120 pages)
- Review work related to several Journals including ASTM-Geotechnical Testing Journal, Springer journal KSCE (Korean Society for Civil Engineers), Environmental Geotechnics by ICE, Canadian geotechnical journal, Measurements, Norwegian Geology Journal etc.
- Review International conferences including 12th IACMAG (2008), 7th NUMGE 2010, 13th IACMAG 2011, 2nd ICTG-Japan (2012), TRA (2013), IGS(2014)
- Member of Conference International Scientific Committees/International Advisory Committee- 14th IACMAG (2014), International workshop on landslides in Sensitive clays (IWLSC, 2013), 13th IACMAG (2012), 7th NUMGE (2010)
- Chair - 2nd workshop in landslide in sensitive clays in 2017 in Norway www.ntnu.edu/iwlsc2017
- Organizer and Chair – Workshop on Earth observations and Machine learning during the World Landslide forum on landslides, Kyoto Japan 2020

JOURNAL PAPERS

1. Amundsen, Helene Alexandra; Emdal Arnfinn, Thakur, Vikas Kumar Singh.(2019) Field and laboratory study of stress relief due to unloading in block samples of sensitive clay. (accepted for publication), in print. (tidsskrift Nivå 2)
2. Amundsen, Helene Alexandra; Thakur, Vikas Kumar Singh. Storage Duration Effects on Soft Clay Samples. Geotechnical Testing Journal 2018 ;Volume 42.(2)
3. Thakur, Vikas Kumar Singh; Nordal, Steinar; Gioacchino, Viggiani; Charrier, Pacal. Shear bands in undrained plane strain compression of Norwegian quick clays. Canadian geotechnical journal (Print) 2018 ;Volume 55.(1) p. 45-56 NTNU (Tidsskrift Nivå 2)
4. Yifru, Ashenafi Lulseged; Laache, Emilie; Norem, Harald Anders; Nordal, Steinar; Thakur, Vikas Kumar Singh. Laboratory investigation of performance of a screen type debris-flow countermeasure. HKIE Transactions 2018 ;Volume 25.(2) p. 129-144
5. Amundsen, Helene A.; Jønland, Jan; Emdal, Arnfinn; Thakur, Vikas Kumar Singh. An attempt to monitor pore pressure changes in a block sample during and after sampling. Geotechnique Letters 2017 ;Volume 7.(2) p. 119-128 NTNU (Tidsskrift Nivå 2)
6. Amundsen, Helene Alexandra; Jønland, Jan; Emdal, Arnfinn; Thakur, Vikas Kumar Singh; Won, J.

- Y.; Greenwood, J. D.; Contreras, I. A.; Hernandez-Martinez, Francisco Gabriel. Discussion: An attempt to monitor pore pressure changes in a block sample during and after sampling. *Geotechnique Letters* 2017 ;Volume 7.(4) p. 352-355 (Tidskrift Nivå 2)
7. Thakur V (2014) "Can we assess the effect of storage time on fine-grained soil samples?" Invited Editorial paper, *International Journal of Environmental Geotechnics*, Volum 1 issue 4 pp
 8. Thakur V and Degago S (2014) "Quickness test approach for assessment of flow slide potentials" *Geotechnical Engineering Journal of the SEAGS and AGSSEA: Physical Modelling in Geotechnical Engineering*, March Volume 45, pp 45-55.
 9. Thakur V and Degago S (2013) "Disintegration of soft sensitive clays" *Géotechnique Letters*, Volume 3, issue 1, pp 21-25.
 10. Thakur V (2013) "Orientation of locally drained shear bands in contractant clays" *International Journal of Geotechnical Engineering*, Volume 7, Nr. 3, pp 311-317.
 11. Thakur V and Degago S (2012) "Quickness of sensitive clays" *Geotechnique Letters*. Vol. 2, pp 87-95.
 12. Thakur V (2012) "Groundwater leakage induced subsidences into tunnels" *Indian Geotechnical Journal by Springer*. Vol 42 (1), pp 37-48.
 13. Thakur V (2011) "Numerically observed shear bands in soft sensitive clays" *Geomechanics and Geoengineering: an international Journal*. Vol. 5, pp 532-546.
 14. Thakur V K S and Singh D N (2007) "Evaluation of various Pedo transfer function to developing soil water characteristics curve of a silty soil." *Geotechnical Testing Journal, ASTM*. Volume 30, issue 1 pp .1-6.
 15. Thakur, V K S, Sreedeeep, S and Singh, D N (2006) "Laboratory Investigations on Extremely High Suction Measurements for Fine-grained Soils." *Geotechnical and Geological Engineering*. 24(3) pp. 565-578. (Tidskrift nivå 2)
 16. Thakur V K S, S Sreedeeep and Singh D N (2006) Closure to "Parameters Affecting Soil Water Characteristic Curves of Fine-Grained Soils." *Journal of Geotechnical and Geo-environmental Engineering, ASCE*, Vol. 132, No. 11, pp.1510-1511. (Tidskrift nivå 2)
 17. Thakur V (2006) "Rate independent elastoplastic analysis of strain localization in soft sensitive clays" *Elctronic Journal of Geotechnical Engineering*
 18. Thakur V K S and Singh D N (July-2005) "Rapid Determination of Swelling Pressure of Clay Minerals." *Journal of Testing and Evaluation, ASTM*. Volume 33, issue 4 pp .239-245.
 19. Thakur V K S, Singh D N and S Sreedeeep,(2005) "Parameters Affecting Soil Water Characteristic Curves of Fine-Grained Soils." *Journal of Geotechnical and Geo-environmental Engineering, ASCE*, Vol. 131, No. 4, pp.521-524.
 20. Thakur V , Nordal S, and Grimstad G (2005) "Phenomenological issues related to strain softening in sensitive clays" *International Journal of Geotechnical and Geological Engineering*. Published online.

PEER REVIEWED CONFERENCE PAPERS AND BOOK CHAPTERS

1. Thakur Vikas and Kala Uday (2019) "Landslides and Mitigations". Keynote paper at 53rd Indian Geotechnical Conference. Surat, India.
2. Emir Ahmet Oguz, Kate Robinson, Ivan Depina, Vikas Thakur (2019) IoT-based strategies for risk management of rainfall induced landslides: A review. Accepted for publication. 7th International Symposium on Geotechnical Safety and Risk, Taiwan.
3. Vicari Herve, Yifru Ashenafi, Nordal Steinar Thakur Vikas (2019). Debris flow modelling using flumes. European Geosciences Union EGU. Vienna, 6th April.
4. Ivan Depina, Emir Ahmet Oguz and Vikas Thakur(2019) Learning about Uncertain Predictions of Rainfall-Induced Landslides from Observed Slope Performance. Accepted for publication. 7th International Symposium on Geotechnical Safety and Risk, Taiwan.
5. Yifru A, Vicari H, Nordal S, Thakur V (2019) Laboratory investigation of the impact force of debris flow on a passable structure. Accepted for publication in XVII European Conference on. Soil Mechanics and Geotechnical Engineering Reykjavik Iceland.
6. Kim, Jihwan; Liu, Zhongqiang; Lacasse, Suzanne; Nordal, Steinar; Thakur, Vikas Kumar Singh (2019). Runout of Flow Landslides. I: Geotechnics for Natural and Engineered Sustainable

- Technologies (GeoNEst). Springer 2018 ISBN 978-981-10-7721-0. p. 433-445. (Key note paper)
7. Liu, Zhongqiang; Lacasse, Suzanne; Nadim, Farrokh; L'Heureux, Jean-Sebastien; Jihwan, Kim; Thakur, Vikas Kumar Singh. Modelling of landslide runout in sensitive clays. 7th Canadian Geohazards Conference. Geohazards 7; 2018-06-03 - 2018-06-06. (Key note paper)
 8. Thakur, Vikas Kumar Singh; Degago, Samson Abate. Recommended Practice for Soft Clay Characterization with a focus on settlement and stability analysis. Indian Geotechnical Conference; 2018-12-12 - 2018-12-15. (Key note paper)
 9. Yifru, Ashenafi Lulseged; Pradhar, Rocy Nhuchher; Nordal, Steinar; Thakur, Vikas Kumar Singh. Preliminary study of debris flow impact force on a circular pillar. I: Physical Modelling in Geotechnics. CRC Press 2018 ISBN 978-1-138-55975-2. p. 1105-1110
 10. Amundsen, Helene A.; Dang, Helena; Adamson, Matthew; Emdal, Arnfinn; Thakur, Vikas Kumar Singh. A New Laboratory Procedure to Study Stress Relief in Soil Samples. I: Landslides in Sensitive Clays - From Research to Implementation. Springer 2017 ISBN 978- 3-319-56486-9. s. 121-132 NTNU
 11. Grue, Ragnhild Håøy; Issler, Dieter; L'Heureux, Jean-Sébastien; Thakur, Vikas Kumar Singh. Viscometric Tests of Sensitive Clay from Byneset, Norway, and Fit to the Herschel– Bulkley Model. I: Landslides in Sensitive Clays - From Research to Implementation. Springer 2017 ISBN 978-3-319-56486-9. s. 155-166 NGI NTNU
 12. Strand, Stein-Are; Thakur, Vikas Kumar Singh; L'Heureux, Jean-Sébastien; Lacasse, Suzanne; Karlsrud, Kjell; Nyheim, Trude; Aunaas, Kristian Vågen; Ottesen, Hanne Bratlie; Gjelsvik, Vidar; Fauskerud, Odd Arne; Sandven, Rolf; Rosenquist af Åkershult, Anders. Runout of Landslides in Sensitive Clays. I: Landslides in Sensitive Clays - From Research to Implementation. Springer 2017 ISBN 978-3-319-56486-9. s. 289-300 NGI NTNU
 13. Thakur, Vikas Kumar Singh; Gjelsvik, Vidar; Fauskerud, Odd Arne; Christensen, Stein Olav; Oset, Frode; Viklund, Margareta; Strand, Stein-Are. Recommended Practice for the Use of Strength Anisotropy Factors in Stability Calculations. I: Landslides in Sensitive Clays - From Research to Implementation. Springer 2017 ISBN 978-3-319-56486-9. s. 249-258
 14. Thakur, Vikas Kumar Singh; L'Heureux, Jean-Sébastien; Locat, Ariane. Landslide in Sensitive Clays – From Research to Implementation. I: Landslides in Sensitive Clays - From Research to Implementation. Springer 2017 ISBN 978-3-319-56486-9. s. 1-11
 15. Thakur, Vikas Kumar Singh; L'Heureux, Jean-Sébastien; Locat, Ariane. Landslides in Sensitive Clays - From Research to Implementation. Springer 2017 (ISBN 978-3-319-56486-9) ;Volum 46.603 s. Advances in Natural and Technological Hazards Research(1)
 16. Thakur V (2016) “ Characterisation of soft clays for engineering design purposes. 51st Indian Geotechnical Conference. Invited lecture
 17. Thakur V (2016) “Back claulation of flow slides in Norway”. International Conference on Forensic Geotechnical Engineering. Bengaluru, India Invited Lecture.
 18. Thakur V (2016) “Landslide in sensitive clays: some assessment and mitigation strategies. Special lecture during the Nordic Geotechnical Meeting in Iceland, May 26th.
 19. Thakur V , Fauskerud OA, Gjelsvik V, Christensen S, Oset F, Viklund M, Stran SA, Nordal S (2016) “A procedure for the assessment of undrained shear strength profile in soft clays. Nordic Geotechnical Meeting in Iceland, May 26th.
 20. Dolva B K and V Thakur (2016) " Towards a robust transportation infrastructure in Norway to respond the extreme weather events". Submitted to Transport Research Board, January 2016, Washington.
 21. Thakur V , (2016) “Assessment of undrained shear strength of soft clays using the field and laboratory testing methods. Theme lecture during the 50th Indian Geotechnical Conference, Pune, December 14th.
 22. Thakur V (2014) “Can we assess the effect of storage time on fine-grained soil samples?” Invited Editororial paper, International Journal of Environmental Geotechnics, Volum 1 issue 4 pp
 23. Thakur V and Degago S (2014) “Quickness test approach for assessment of flow slide potentials” Geotechnical Engineering Journal of the SEAGS and AGSSEA: Physical Modelling in Geotechnical Engineering, March Volume 45, pp 45-55.

24. Thakur V and Degago S (2013) "Disintegration of soft sensitive clays" *Géotechnique Letters*, Volume 3, issue 1, pp 21-25.
25. Thakur V (2013) "Orientation of locally drained shear bands in contractant clays" *International Journal of Geotechnical Engineering*, Volume 7, Nr. 3, pp 311-317.
26. Thakur V and Niggusie D (2014) "Run out of sensitive clay debris: significance of the flow behavior of sensitive clays". *Geotechnical Engineering Journal of the SEAGS and AGSSEA: Physical Modelling in Geotechnical Engineering*, September issue.
27. Thakur V and Degago S (2012) "Quickness of sensitive clays" *Geotechnique Letters*. Vol. 2, pp 87-95.
28. Thakur V (2012) "Groundwater leakage induced subsidences into tunnels" *Indian Geotechnical Journal by Springer*. Vol 42 (1), pp 37-48.
29. Thakur V and Degago S (2015) " UNDERSTANDING THE DISINTEGRATION PROCESS IN SENSITIVE CLAYS USING REMOLDING ENERGY CONCEPT". 15th Pan America Conference, Argentina. November 2015. (accepted).
30. Amundsen H, Thakur V and Emdal A (2015) " Comparison of the sample assessment methods applied to oedometer test results". 15th Pan America Conference, Argentina. November 2015.
31. Thakur V, Gylland A, Sandven R and Degago S (2015) " In-situ measurement of remolding energy of sensitive clay" *GeoQuebec*, Quebec, September 2015 (accepted).
32. Amundsen H, Sandven R, Emdal A and Thakur V (2015) " On engineering characterisation of a low plastic sensitive soft clay". *GeoQuebec*, Quebec, September 2015 (accepted).
33. Thakur V , Niggusie D, Degago S (2014) A preliminary study of rheological models for run-out distance modelling of sensitive clay debris. *Numerical Methods in Geotechnical Engineering*, pp 115-120.
34. Thakur V, Degago S (2014) Remolding Energy as indicator to identify flow slides. 14th International Conference on Advances on Computational Methods and Geomechanics. Kyoto, Japan.
35. Thakur V , Niggusie D, Degago S (2014) A preliminary study of rheological models for run-out distance modelling of sensitive clay debris. *Numerical Methods in Geotechnical Engineering*, pp 115-120.
36. Thakur V (2014) Experimentally observed shear bands in a Scandinavian soft clay subjected to an undrained shearing under the plane strain condition. 14th International Conference on Advances on Computational Methods and Geomechanics. Kyoto, Japan.
37. Thakur V and Amundsen K (2014) Storage effects on fine-grained soils. *Indian Geotechnical Conference*, Kakinada, India.
38. Thakur V and Dolva B K (2014) " Challenges related to Transportation Infrastructures on sloping terrain consists of soft clays". *Transport Research Arena, TRA*, ID 19762.
39. Thakur V, Degago S A, Oset F, Dolva B K and Aabøe R (2013) A new approach to assess the potential for flow slide in sensitive clays. *Une nouvelle approche pour évaluer le potentiel de Coulée dans les argiles sensibles*. International conference on soil mechanics and geotechnical engineering, ISSMGE, Paris, France, pp 2265-2269.
40. Thakur V (2012) " Infrastructures on soft sensitive clays: some aspects related to the flow behaviour of remoulded materials". *Asiafuge-2012*. (Invited speaker)
41. Thakur V and Degago S (2012) "Utbredelse av skred i sensitive leirer" *Proceedings of Quick clay workshop*, ISBN: 978-82-410-0821-4, pp 139-153.
42. Thakur V (2012) "Field observation on generation and dissipation of pore pressure during lime cement stabilisation". *Indian Geotechnical Conference*, New Delhi, Dec. 2012, pp 343-346.
43. Thakur V, Oset F, Degago S A, Berg P O, Aabøe R, Wiig T, Elisabeth E D, Lyche E, Sæter M B, Robsrud A (2011) "A critical appraisal on the definition of Brittle clays". *Nordic Geotechnical Meeting*. Copenhagen, May 2012. (Special lecture)
44. Thakur V, Oset F, Degago S Aabøe R, Watn A (2012) "Transportation Infrastructure on Soft sensitive clay:Some essential aspects and examples. *Second International Conference on Transportation Geotechnics*, Japan, pp 836-842.
45. Thakur V, Oset F, Aabøe R, Wiig T, Elisabeth E D, Lyche E (2012) "A critical review of the definition

- of Brittle clays adopted in Norwegian practice". 2nd International Conference on Landslides, ISL, Banff, Canada.
46. Taurisano A, Lyche E, Thakur V, T. Wiig T, Øvrelid K, Devoli G (2012) Ethical questions in landslide management and risk reduction in Norway. Geophysical Research Abstract Geophysical Research Abstracts Vol. 14, EGU2012-9375-1.
 47. Thakur, V., Degago S. A., Oset, F., Aabøe, R., Dolva, B.K., Aunaas, K., Nyheim, T., Lyche, E., Jensen, O. A., Sæter, M. B., Robsrud, A., Viklund, M., and Nigussie, D. (2013): Characterisation of post-failure movements of landslides in soft sensitive clays. *Advances in Natural and Technological Hazards Research* by Springer, pp 91-103. (to appear in sept. 2013)
 48. Thakur V., Kornbrekke H A, Jostad H P and Degago s (2013) "How well do we understand strain softening response of soft sensitive clays at laboratory strain levels". *Advances in Natural and Technological Hazards Research* by Springer, pp 291-303. (to appear in sept. 2013)
 49. Oset, F., Thakur, V., Aunaas, K., Dolva, B.K., Sæter, M. B., Robsrud, A., Viklund, M., Nyheim, T., Lyche, E., and Jensen, O. A., (2013): Regulatory framework for road and railway construction on the soft sensitive clays of Norway. *Advances in Natural and Technological Hazards Research* by Springer (to appear in sept. 2013)
 50. Jostad H.P., Fornes, P. and Thakur, V. (2013): Effect of strain-softening in design of fills in gently inclined areas with soft sensitive clays. *Advances in Natural and Technological Hazards Research* by Springer (to appear in sept. 2013)
 51. Engelsen Christian John, Arora V, Gedam V, Sandeep K, Mullick A K, Srinivasan I, Myrdal R, Labhasetwar P K, Reknes K, Justnes H, Thakur V (2011) "The Indo-Norwegian Project on Alternative Materials in Cement and Concrete – Systematic Accumulation of Material Properties" *Proceedings of the 12th NCB International Seminar on Cement and Building Materials*, pp 347-350.
 52. Thakur V (2011) "Numerically observed shear bands in soft sensitive clays" *Geomechanics and Geoenvironmental Engineering: an international Journal*. Vol. 5, pp 532-546.
 53. Thakur V K S and Singh D N (2007) "Evaluation of various Pedo transfer function to developing soil water characteristics curve of a silty soil." *Geotechnical Testing Journal*, ASTM. Volume 30, issue 1 pp 1-6.
 54. Thakur, V K S, Sreedeeep, S and Singh, D N (2006) "Laboratory Investigations on Extremely High Suction Measurements for Fine-grained Soils." *Geotechnical and Geological Engineering*. 24(3) pp. 565-578.
 55. Thakur V K S, S Sreedeeep and Singh D N (2006) Closure to "Parameters Affecting Soil Water Characteristic Curves of Fine-Grained Soils." *Journal of Geotechnical and Geo- environmental Engineering*, ASCE, Vol. 132, No. 11, pp.1510-1511.
 56. Thakur V (2006) "Rate independent elastoplastic analysis of strain localization in soft sensitive clays" *Electronic Journal of Geotechnical Engineering*
 57. Thakur V K S and Singh D N (July-2005) "Rapid Determination of Swelling Pressure of Clay Minerals." *Journal of Testing and Evaluation*, ASTM. Volume 33, issue 4 pp 239-245.
 58. Thakur V K S, Singh D N and S Sreedeeep,(2005) "Parameters Affecting Soil Water Characteristic Curves of Fine-Grained Soils." *Journal of Geotechnical and Geo- environmental Engineering*, ASCE, Vol. 131, No. 4, pp.521-524.
 59. Thakur V, Nordal S, and Grimsad G (2005) "Phenomenological issues related to strain softening in sensitive clays" *International Journal of Geotechnical and Geological Engineering*. Published online.
 60. Christian J. Engelsen, Roar Myrdal, Vikas Thakur, Harald Justnes and Kåre Helge Karstensen (2009) "Current status of the framework for environmental impact assessment in Europe regarding cement based materials" 11th NCB Seminar, India On Cement and Building Materials, 17-20 November 2009, New Delhi, India.
 61. C J Engelsen, P K Labhasetwar, S C Sharma, K. Nath P, K Reknes, A K Mullick, P Fidjestøl, P Brevik, R Myrdal, H Justnes and V Thakur (2009) "Environmental friendly strategy for Waste Management in India Utilising Cement and Concrete Production Technology – Indo Norwegian BILATERAL initiative" 11th NCB Seminar, India On Cement and Building

RESEARCH VISITS

1. **November - December 2015** : Disaster Prevention Research Institute, Kyoto, Japan (to come)
 - Japanese Society for the Promotion of Sciences has awarded a fellowship to work on climate change and natural hazards. This stay at DPRI will be to carry out a joint research on this topic.
 - **Contact : Prof. Gonghui Wang, Kyoto, Japan**
2. **September 2014** : Disaster Prevention Research Institute, Kyoto, Japan
 - **Contact : Prof. Gonghui Wang, Kyoto, Japan**
3. **October 2013** : Laval University, Quebec Canada
 - A week long stay at the Laval University to discuss various aspect of slope stability and landslide challenges related to natural slopes. The visit will include an interaction with the scientists who are actively working on slope stability, flow slides, run-out modelling etc. This visit is separate from the IWLS conference which will be organized by the Laval University later this year.
 - **Contact : Prof. Serge Leroueil and Professor Jaques Locat, Laval University, Quebec, Canada**
4. **January 2012** : National Institute of Technology, Raipur, Chhattisgarh, India
 - Visiting Faculty "Geotechnical practice in soft clays"
 - **Contact : Prof. L. K. Yadu (National Institute of Technology Raipur)**
5. **December 2011** : Indian Institute of Technology Madras, Chennai
 - Guest lecture "Challenges related to construction on soft clays"
 - **Contact : Prof. A. DaliNaidu (Indian Institute of Technology Madras)**
6. **December 2011** : Indian Institute of Science Bangalore
 - Visiting lecture "Some aspects of soft Scandinavian clays"
 - **Contact : Prof. G.L.S. Babu (Indian Institute of Science Bangalore)**
2. **September 2011** : Indian Institute of Technology Bombay, Mumbai
 - Visiting Faculty "Geotechnics of Soft Scandinavian clays"
 - **Contact : Prof. D. N . Singh (Indian Institute of Technology Bombay)**
7. **January 2011** : Indian Institute of Technology Bombay, Mumbai
 - Guest lecture "Particle image analyses in geotechnical engineering"
 - **Contact : Prof. D. N . Singh (Indian Institute of Technology Bombay)**
8. **October 2010** : Indian Institute of Technology Bombay, Mumbai
 - Guest lecture "Geotechnical Construction on soft marine clays"
 - **Contact : Prof. D. N . Singh (Indian Institute of Technology Bombay)**
9. **May 2010**: PLAXIS BV, The Netherlands
 - "Study tour to PLAXIS: Extended Finite element modelling".
 - **Contact: Dr. Ronald Brinkgreve (PLAXIS)**
10. **May 2006- August 2006**: PLAXIS BV, The Netherlands
 - "Introduction of Extended Finite element modelling in geotechnical practice: Development of Double porosity model". This model can be used to simulate strong discontinuity in geomaterial as well as to model fluid and gas migration from the fractured media.
 - **Contact: Dr. Ronald Brinkgreve (PLAXIS)**

11. **April 2006- May 2006:** SINTEF, Trondheim, Norway
- **“Geotechnical Evaluation of Breakwater Construction in Arctic Region: GISSAC Project”.** Finite element modelling and hand calculations were performed to check for a suitable design of the reinforced Breakwater resting on sea bed in Svea, Svalbard.
 - **Contact: Arnstein Watn, SINTEF, Trondheim**
12. **September 2005- February 2006:** Laboratory 3S, Grenoble, France
- **“Experimental Investigation: Plane Strain Biaxial Testing in *Norwegian Quick Clays*”.** The overall idea was to investigate the strain localization in soft sensitive clays.
 - **Contact : Prof Cino Viggiani, Grenoble, France**
13. **June 2005-August 2005:** NGI, Oslo, Norway
- **“SIP 8: Rate dependent modelling”.** A partial contribution in development of rate dependent model that can be used to capture localization
 - **Contact: Dr. Hans Petter Jostad and Dr. Lars Andresen, NGI, Oslo**
14. **June 2004- August 2004:** NGI-ICG, Oslo, Norway
- **“Coupled pore water and strain localization study using PLAXIS”**
 - **Contact: Dr. Hans Petter Jostad and Dr. Lars Andresen, NGI, Oslo**

Teaching experience from universities or college as a guest lecturer (minimum 4-6 hours long lectures) and as a tutor for a complete semester

Year	Course/Subject name	University/Institution	Roll
Fall 2001	Steel Structures	3 rd year Indian Institute of Technology, Bombay (>100 students)	Tutor – complete semester (Structure laboratory)
Spring 2002	Geotechnical Engineering	4 th year Indian Institute of Technology, Bombay (10 students)	Tutor – complete semester (Geotechnical laboratory)
Spring 2005	TBA 4115 Finite element in geotechnical engineering	4 th year NTNU (~25 students)	Tutor- Plaxis 2D - complete semester Lecturing occasionally
Spring 2005	Slope Stability and landslides	5 th year NTNU (~25 students)	Guest lecturer : Slope stability calculation using Plaxis 2D
Spring 2006	Slope Stability and landslides	5 th year NTNU (~25 students)	Guest lecturer : Slope stability calculation using Plaxis 2D
Spring 2006	TBA 4115 Finite element in geotechnical engineering	4 th year NTNU (~35 students)	Tutor- Plaxis 2D - complete semester Lecturing occasionally
Spring 2007	TBA 4115 Finite element in geotechnical engineering	4 th year NTNU	Tutor- Plaxis 2D - complete semester

		(~35 students)	Lecturing occasionally
Fall * 2007	Soil Dynamics Short course(2,5 credit course)	5 th year, NTNU (2 students)	Course teacher (complete course)
Fall 2008	AT 205 Frozen ground engineering	4 th year, University Centre in Svalbard (UNIS) (~25 students)	Guest lecturer : Creep in frozen soils
Spring 2011	Slope Stability and Landslide	5 th year, NTNU (~25 students)	Guest lecturer : Geosuite Slope Stability for real cases
Spring 2012	Slope Stability and Landslide	5 th year, NTNU (~25 students)	Guest lecturer : Geosuite Slope Stability for real cases
Spring 2013	Geotechnical Engineering	2 nd year student, University College in Telemark (30 students)	Guest lecture: slope stability and quick clays
Fall** 2013	Geotechnical Engineering	University College Østfold, Fredrikstad (~40 students)	Guest lecture: Stability of Natural slopes
Fall ** 2013	EVU course: Geotechnical Engineering-1	Master students, NTNU (10-15 students)	Guest lecture: Slope Stability
Spring 2015	Foundations and Slopes	4 th Year students NTNU	Course teacher
Autumn 2015	Geohazard and Risk assessment	4 th Year students NTNU	Course teacher
Autumn 2015	Geoteknikk-1	EVU kurs	Course teacher
Autumn 2015	Geoteknikk IB204914	2 nd year students HiÅ	Course teacher
Autumn 2016	Geoteknikk IB204914	2 nd year students NTNU i Ålesund	Course teacher
Spring 2017	Geoteknikk og geologi TBA 4100	2 nd year students NTNU i Trondheim	Course teacher (Nominert Norconsultpris)
Autumn 2017	Geohazard and Risk assessment	4 th Year students NTNU	Course teacher
Autumn 2017	Geoteknikk-1	EVU kurs	Course teacher
Autumn 2017	Geoteknikk IB204914	2 nd year students HiÅ	Course teacher
Spring 2018	Geoteknikk og geologi TBA 4100	2 nd year students NTNU Trondheim	Course teacher (Norconsultpris)
Autumn 2018	Geohazard and Risk assessment	4 th Year students NTNU	Course teacher
Autumn 2018	Geoteknikk-1	EVU kurs	Course teacher
Autumn 2018	Geoteknikk IB204914	2 nd year students HiÅ	Course teacher
Spring 2019	Geoteknikk og geologi TBA 4100	2 nd year students NTNU i Trondheim	Course teacher

Supervision of students

Nr	Year	Student name	Title	Level	In association with
1	2005	Gustav Grimstad	Laboratory inspection of strain localization in quick clays	Semester project	Prof. Steinar Nordal NTNU
2	2007	Aleksander Stijacic	Numerical modelling of shear band orientation in sensitive clays	Master thesis	Arnfinn Emdal NTNU
3	2007	Yared Bekele	Numerical and Experimental investigation of local pore water flow in soft clays	Master thesis	Prof. Steinar Nordal NTNU
4	2008	Yesuf Girum	Behaviours of quick clays under varying strain rates: numerical and experimental study	Master thesis	Dr. Samson Degago NTNU
5	2008	Ellen Katrine Wensas	Significance of local pore water flow in laboratory size and field scale geotechnical problems	Master thesis	Prof. Steinar Nordal NTNU
6	2009	Magnus Petersen	Fv 900 Klett Heimdal project	Summer project	University College in Sør Trondelag (HiST)
7	2010	Magnus Brubakk	Progressive failure analysis in strain softening slopes	Master thesis	Prof. Thomas Benz NTNU
8	2010	Viktor Smith	Progressive failure analysis in strain softening slopes	Master thesis	Prof. Thomas Benz NTNU
9	2010	Mortein Tveit	Stability Lenaelva area	Semester project	NTNU
10	2010	Magnus Petersen	Fv 900 Klett Heimdal	Summer project	HiST
11	2011	Audun E Sanda	Lime cement stabilisation of quick clays	Master thesis	Arnfinn Emdal NTNU
12	2011	Morten Tveit	Slope stability calculation using locally undrained and globally drained concept	Master thesis	Prof. Steinar Nordal NTNU
13	2011	Lauritz Hjelvik	3D visualisation of terrain using Novapoint 3D virtual map	Semester project	HiST
14	2011	Terje Strømme	Local undrained global drained condition	Summer project	NTNU

15	2011	Terje Strømme	Calculation of stability og slopes with the local undrained global drained concept	Semester project	Prof. Steinar Nordal NTNU
16	2012	Helene Kronbekke	Slope stability calculations based on input parameters obtained from the block samples	Master thesis	Arnfinn Emdal NTNU
17	2012	Annette Kleppe	What is brittle clays?	Bachelor thesis	Olav Aarhaug HiST
18	2012	Morten Hoel	Quickness of sensitive clays	Bachelor thesis	Olav Aarhaug HiST
19	2012	Erlend Hundal	Quickness of sensitive clays	Bachelor thesis	Olav Aarhaug HiST
20	2012	Daniel Nigussie	Numerical modelling of run-out of landslide debris	Summer project	NTNU
21	2012	Hao Zang	Run-out distance of quick clay slides	Summer project	NTNU
22	2013	Fredrikke Syversen	Mineralogical aspects of quick clays of Norway	Master thesis	Prof. Per Aagård University of Oslo
23	2013	Tesfaye Kerlos	Detection of sensitive clays using various sounding techniques	Master thesis	Prof. Rolf Sandven Multiconsult Arnfinn Emdal NTNU
24	2013	Siri Ulvestad	Remoulding energy of sensitive clays	Master thesis	Arnfinn Emdal NTNU, Trondheim
25	2013	Daniel Nigussie	Retgression and run-out of soft sensitive clays	Master thesis	Arnfinn Emdal NTNU, Trondheim
26	2013	Navid Zamani	Experimental modelling of flow slides	Bachelor thesis	Olav Aarhaug HiST
27	2013	Z A A Said	Experimental modelling of flow slides	Bachelor thesis	Olav Aarhaug HiST
28	2013	Martin Mikalsen	Experimental modelling of flow slides	Bachelor thesis	Olav Aarhaug HiST
29	2014	Emil Cederström*	Uncertainties in slope stability calculations	Master thesis	Prof. Claes Alen Chalmers University
30	2014	Jonny Solbjørg	Pile foundation for Tresfjord bridge	Bachelor thesis	Aalesund University College

31	2014	Vegard Lunde	Pile foundation for Tresfjord bride	Bachelor thesis	Aalesund University College
32	2014	Simen Børstad	Pile foundation for Tresfjord bride	Bachelor thesis	Aalesund University College
33	2015	Xiang Yu	Kinematic of debris flow	Master thesis	NTNU
34	2015	Ragnhild Grue	Rheology of sensitive clays	Master thesis	NTNU
35	2015	Helge Tovslid	Storage effects on fine grained soils	Master thesis	NTNU
I*	2014-2018	Helene Amundsen	Effect of storage time on sample quality assessment of sensitive clays	PhD	NTNU
II*	2016 – 2019	Ashenafi Yifru	Effective countermeasures against debris and mudflow along E39	PhD	NTNU
III*	2018-2021	Emir Oguz	IoT based Geohazards assessment framework for shallow landslides	PhD	NTNU
IV*	2018-2021	Herve Vicari	Debris flow mitigation using entrainment reduction techniques	PhD	NTNU
V*	2018-2022	Gebray Alene	Digital transformations: Modelling and Visualisation of flow slides in sensitive clays	PhD	NTNU

* Average 5 -8 master thesis each year related to the PhD topics

SELECTED INDUSTRIAL PROJECTS

1. Flexible learning in geotechnical engineering (FLIGG II – 2018-2020) – Finansiert av Direktoratet for kvalitet i utdanning (DiKU)

Fleksibel læring i grunnleggende geoteknikk II (FLIGG II) skal ha et bredt samarbeid for å styrke geoteknikk-kompetansen gjennom å utarbeide moderne læremateriell av høy faglig kvalitet, tilrettelagt for e-læring. Materiellet blir prøvd ut i pedagogiske opplegg for e-læring for ulike målgrupper og for å gjøre dette samler vi et "landslag" av fagfolk med lang og variert praksis fra anvendt geoteknikk, og fra undervisning i faget. Materialet som prosjektet produserer er fritt tilgjengelig til bruk for bransjen og utdanningsinstitusjoner. FLIGG II videreutvikler ulike typer av interaktive digitale læremidler, vurderingsmetoder og prøve ut ulike tilnærminger med kombinasjon av animasjoner, quiz, forelesninger, oppgaver og presentasjoner. Hensikten er å utforme fleksible opplegg på en digital plattform som skaper god studentaktivitet og som man har mulighet til å evaluere. Prosjektsamarbeidet skal stimulere til økt samhandling mellom bygg- og anleggsnæringen og høyere utdanningsinstitusjoner. Prosjektet vil kunne bidra til økt rekruttering av byggingeniører. FLIGG II bygger videre på FLIGG prosjektet (2015-2017). Resultater fra FLIGG finnes på NTNUs nettside.

2. Flexible learning in geotechnical engineering (FLIGG – 2015-2017) finansiert av Norgesuniversitet

Synopsis: *The project will produce ICT-supported learning materials that will be widely available. The project will be an innovative development for training in basic geotechnics. It includes topics such as soil properties, field and laboratory work, geotechnical structures, calculation and construction geotechnics. The project will be a learning arena that inspire and encourage staff in academic communities and social partners to adopt*

the technology for flexible learning and developing flexible study. Aalesund University College is leading the project with the following partners: The colleges in Bergen, Sør-Trøndelag and Østfold, Norway's Environment and Life Sciences University, Norwegian University of Science and Technology, MultiConsult, the Norwegian Water Resources and Energy Directorate, National Rail Administration, Norwegian Public Roads Administration, Næringslivsringen, Norwegian Geotechnical Association, the Norwegian Geotechnical Institute. This is a project financed by the Norgesuniversitet and the industries.

3. GEOFUTURE II project

GeoFuture II. (2015-2018), funding 26.4 MNOK by the Research council of Norway). Next generation solution for foundation design in geotechnical engineering Role: sub project leader for runout module.

4. OFFPhD in effect of storage in fine grained soil samples

Synopsis: This is a project financed by the Research Council of Norway and the Norwegian Roads authority. The aim of this project is to study the effect of storage time in fine grained soil samples.

5. Gas Migration in the weakness zones in soft seabed sediments, Statoil [Role: Project member] Budget (geotechnical investigations): 6 Million Norwegian kroner]

Synopsis: Seabed sediments contain both large and small amounts of gas. In a soft seabed sediment evidence of this gas can be seen as "pockmarks", which most likely are scars from gas migrating upwards and through the seabed, either by the sudden emission of free gas or as a result of slow, steady gas seeps. Free gas in seabed sediments can lead to problems when drilling oil wells, and can even lead to shallow blow-outs. In some cases this may result in stability problems for the platform the well was drilled from. Vikas Thakur developed a conceptual model describing the all possible mechanism that can cause migration of gases from seabed sediments. The conceptual model was validated using experimental and large scale testing.

6. Designing a new type of flood barrier: The Norwegian Research Council (2008) [Role: Project Manager] Budget: 0.2 Million Norwegian kroner]

Synopsis: An innovative flood protection technique was developed and named Flobar. Flobar is fluid filled flexible tubes to protect infrastructures like houses, properties or the dry land from flooding. Small scale laboratory tests were conducted to simulate flood situations and to investigate the feasibility of the Flobar concept. The experimental part is supplemented by the theoretical and numerical studies. The concept has a great potential to develop commercial products.

7. GISSAC Project Norwegian Research Council [Role: Project member] Budget (geotechnical investigations): 5 Million Norwegian kroner, financed by the Research council of Norway and the Norwegian-French Foundation]

Synopsis: Construction in the arctic region involves special challenges related to temperature regime and climatic conditions, in addition to the great forces that can be generated by ice movements. The access to suitable fill material is low, making it complicated and expensive to build roads and harbours etc. Often, as at Svalbard, the local geology does not provide high quality gravel or crushed rocks, and at the sites where it is available environmental considerations prevent exploitation. The GISSAC-project was initiated as an answer as to how one can build environmental friendly soil structures in the Arctic by using locally available geological materials together with geosynthetics.

The project partners arranged a workshop in Longyearbyen in autumn 2004 to look into current experiences and possible application areas for research and development. The outcome of a literature study performed by SINTEF and the outcome of the seminar is presented in a SINTEF report. Based on the seminar a pilot study was initiated to study the behaviour of a geotextile bag filled with local material in Longyearbyen (Svalbard). The pilot study was performed by Store Norske Spitsbergen Grubekompani (SNSG) with follow-up from SINTEF/NTNU/UNIS/TENCATE/LRPC. The outcome of this study is presented in an UNIS report. The study of the behaviour of geosynthetic bags for erosion control was theoretically studied and thereafter a PhD student performed a field trial by building a test breakwater protected with 150 bags at Svea, Longyearbyen. The behaviour of the bags, the ice forces, wave action and climate impact have been monitored and evaluated thoroughly and the results can be studied in a thesis from UNIS and in a SINTEF-report.

- 8. Geotechnical investigation of overall stability of a quick clay slopes along with the proposed road construction at Fv 717 “Sund-Bradden” area. (2009-2012) [Role: Project Manager- geotechnical. Budget (geotechnical investigations): between 5-6 Million Norwegian kroners]**

***Synopsis:** The Sund Bradden project deals with some interesting geotechnical problems including the construction of an embankment on a soft clay deposit near by the classical Rissa landslide area. Block samples were taken from the clay deposit in addition to an exhaustive field investigation. Geophysical measurements have been made to study the present of sensitive clays deposits. Slope stability calculations were done using the design parameters extracted from the CPTU and the block samples. The results from this project are being published in an International workshop of Landslides in sensitive clays in Canada in 2013.*

- 9. Design and execution of lime-cement stabilisation of a natural slope E:39 -Høgset. (2009-2010) [Role: Project Manager-geotechnical) Budget (geotechnical investigations): between 3 Million Norwegian kroners]**

***Synopsis:** Høgset is located about 200 km south-west of Trondheim in Norway. An area about 300 m x 300 m was stabilised using lime-cement ribs to improve the bearing capacity and the stability of the slope. A 5 m-high-road-fill and a bridge was constructed on the stabilised ground. Due to the marginal safety against stability of the area, an extensive instrumentation was employed during the construction period. Pore pressure measurements were made in between the lime cement ribs. Several technical reports have been written regarding the designing of lime cement column and the field measurements. Results from the project have been presented in several seminars in Norway and also in the Indian Geotechnical Conference in New Delhi in 2012. A journal article is planned.*

- 10. Stability evaluation of road fills on a clay slope Fv 715 “Keiserås-Olsøy”. (2011-2012) [Role: Project Manager- geotechnical) Budget (geotechnical investigations): between 3-5 Million Norwegian kroners]**

***Synopsis:** The project is consists of geotechnical investigation for road fills for about 20 kilometres long span. The roads are planned to construct partly on the weathered rock layers, on peat and also on marine deposits. Several small bridges are to be constructed. Extensive ground investigations have been carried-out. Stability and settlement calculations are being performed for different section of the road.*

- 11. Fv 900 Klett-Heimdal “Geotechnical planning, evaluation and reporting of stability for construction of a new road”, Staten Vegvesen, Trondheim (2009-2013) (Role: Project**

Manager- geotechnical) Budget (geotechnical investigations): 3 Million Norwegian kroner]

***Synopsis:** A 3.3 kilometres long road is being planned to construct on the slopes consists of 10–14m thick sensitive-soft-clay-layer. A sensitive clay layer is located at depth between 6 to 14m from the surface. The side slopes are approximately 1:2 to 1:3, and a river or water-canal is located beside the road. The ground water level is about 2.5m below the ground surface. Short and long term stability of the slope has been evaluated using the Limit Equilibrium and Finite Element methods. Results from the project have been published in 7th European Conference on Numerical Methods in Geotechnical Engineering.*

12. Geotechnical planning and evaluation for road sections on clay slopes - Rv 710 Ingdalsvalset (Agdenes Staten Vegvesen, Trondheim(2009-2011) [Role: Project Manager-geotechnical) Budget (geotechnical investigations): between 10 Million Norwegian kroner]

***Synopsis:** A 18 kilometres long road is under construction. This geotechnical investigation consisted of an extensive onshore and offshore ground investigation, hazard mapping and stability calculation of underwater fills. The project dealt with design of roadfill using light weight aggregates, measurement of vibrations in sensitive clays induced due to rock blasting in the nearby areas. Several technical reports have been written for the project. Results from this project is planned to be published in conference.*

13. BILAT-India Environmental Friendly Strategies for Waste Management in India utilising cement and concrete technology. (2008-2011) [Role: Project Coordinator). Budget: 10 Million Norwegian kroner , financed by the Research Council of Norway]

***Synopsis:** This industry-oriented-bilateral project (10 Million Norwegian kroner) between India and Norway aims to contribute to further increase the utilisation of mineral wastes in Indian cement and concrete industry in an environmental and scientific sound way in order to ensure sustainable energy and resource management. The project will advance the state of the art regarding blended cement and concrete technology as well as providing practical solutions and guidelines. Emphasis will be given to the synergies achieved by using ternary binder systems in concrete mixes as well as the use of appropriate admixtures in order to integrate certain waste materials at higher levels than today's practice. Moreover, focus will also be on internationalization of research in institutional and industrial level to maintain competence and readiness for technologies to practice and promote sustainable future growth. It aims to use the experiences gained by the Indian partners in close relation with Norwegian partners, in order to take benefits of increased use of mineral wastes. SINTEF Building and Infrastructure will lead the project in cooperation with the Indian partners; NEERI (National Environmental Engineering Research Institute), NCB (National Council for Cement and Building Materials), and the three Norwegian industrial partners; Borregaard LignoTech, Elkem as Materials and Norcem AS. This project will also contribute in knowledge building in the climate and environmental sector to encourage sustainable development on economically growing developing country like India by bringing industrial and institution under the BILAT program.*

The following were the outcome of the project:

- *Increased knowledge of the chemical and physical mechanisms in ternary combinations of different mineral wastes, silica fume and alternative pozzolanic materials like bagasse ash in conjunction with lignosulphonate based bio-admixtures,*
- *Demonstration of the performance of the most viable ternary cement and concrete combinations through conventional laboratory tests as well as in full scale demonstration projects,*
- *Development of a user friendly software based data base for the studied materials regarding the chemical and physical characteristics, geographical availability, legislation and regulation involved etc. The arrangement of the data base will be in such a way that*

regular updates are easily done as well as for the inclusion of other materials not considered in this project.

- Calculations of the potential reduction of CO2 emission, and the reduced waste disposal areas based on the feasible waste integration level,*
- Increased publicity of the demonstrated benefits by different dissemination channels in order to cover all involved parties, i.e. from the waste generator to the end-user. In order to ensure dissemination on a permanent basis, a strategy will be developed and reported,*
- Education of PhD students.*

14. ONGC- pipeline project [Role: Project member) Budget (geotechnical investigations): between 0.4 Million Norwegian kroners]

Synopsis: SINTEF initiated a strategic project to establish an R&D collaboration with Indian institutions. The project led to signing several MoU with the Indian organizations. SINTEF is now collaborating with most of these organizations in several projects in India

15. Business development in India. [Role: Project leader Budget: 0.5 Million Norwegian kroners]

Synopsis: SINTEF initiated a strategic project to establish an R&D collaboration with Indian institutions. The project led to signing several MoU with the Indian organizations. SINTEF is now collaborating with most of these organizations in several projects in India.