Dr Hossam Abuel-Naga

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Area of study

Civil Engineering

Brief profile

Hossam Abuel-Naga is appointed as Associate Professor of Civil Engineering at La Trobe University. Previously, he was Senior Lecturer and Leader of Geo-Engineering at The University of Manchester, Senior lecturer at The University of Auckland, and Research fellow at Monash University.

Hossam has over 20 years experience in geotechnical engineering, specialising in soil behaviour under multi-physical coupled processes. Modelling and measurement methods of this behaviour are gaining acceptance as evidenced by the rapid expansion of this field. Applications of this research area include nuclear waste disposal technology, methane hydrate mining technique, energy foundations, ground improvement, landfill lining system, and more.

Hossam's research portfolio includes around 70 technical publications and has supervised several research students. Hossam's thermo-mechanical model of saturated soils published in Canadian Geotechnical Journal (2007) is internationally recognized as one of the advanced models in this field. Furthermore, Hossam's journal paper in Geotextiles and Geomembranes journal (2008) was selected as one of the best five papers published in this journal of this year. During the last five years, in collaboration with GNS and NIWA, which are the largest

crown research institutes in New Zealand, Hossam was a part of over NZD$ 1.0 million research grants.

Hossam serves as a Reviewer/Panellist for several Research Funding Agencies including, National Science Foundation-USA, Australian Research Council, Portuguese Foundation for Science and Technology, Qatar National Research Fund, and HiCi, King Abdulaziz University, Kingdom of Saudi Arabia. Furthermore, he is on the Editorial Panel of four technical civil engineering journals.

Research interests

Civil engineering materials

- Ground Improvement, Site investigation, Energy Geotechnology, Thermo-hydro-mechanics of soils

Recent publications

2005

- **Abuel-Naga, H.M**., Bergado, D.T., and Rujivipat, P. Thermal consolidation of soft Bangkok clay, International Journal of Lowland Technology, 7(1), 13-22.
- **Abuel-Naga, H.M**., and Bergado, D.T. Thermal conductivity and fabric anisotropy of saturated clays. Geotechnical Engineering Journal of SEAGS, 36(2), 99-108.

2006

- **Abuel-Naga, H. M.,** Bergado, D.T., Grino, L., Rujivipat, P., and Thet, Y. Experimental Evaluation of Engineering Behavior of Soft Bangkok Clay under Elevated Temperature, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 132(7), 902-910.
- Bergado, D.T., Taechakumthorn, C., Lorenzo, G.A., and **Abuel-Naga, H.M**. Yielding behaviour of cement-treated soft Bangkok clay. Soils and Foundations, 46(5), 629-638.
- **Abuel-Naga, H.M**., Bergado, D.T., and Chaiprakaikeow, S. Innovative Thermal Technique for Enhancing the Performance of Prefabricated Vertical Drain System. Geotextile and Geomembranes, 24(6), 359-370.

2007

- **Abuel-Naga, H.M**., Bergado, D.T., and Bouazza, A. Thermally induced volume change and excess pore water pressure of soft Bangkok clay. Engineering Geology, 89(1-2), 144-154.
- **Abuel-Naga, H.M**., Bergado, D.T., and Lim, B.F. Effect of temperature on shear strength and yielding behavior of soft Bangkok clay. Soils and Foundations, 47(3), 423-436.
- Long, P.V, Bergado, D.T., and **Abuel-Naga, H.M**. Geosynthetics reinforcement application for tsunami reconstruction: evaluation of interface parameters with silty sand and weathered clay. Geotextile and Geomembranes, 25(4-5), 311-323.

- **Abuel-Naga, H.M**., Bergado, D. T., Bouazza, A., and Ramana, G. V. Volume Change Behavior of Saturated Clays under Drained Heating Conditions: Experimental Results and Constitutive Modeling, Canadian Geotechnical Journal, 44, 942-956
- Pothiraksanon, C., Bergado, D.T., **Abuel-Naga, H.M.**, Hayashi, S., and Du., Y. J. Novel Thermo-Consolidation technique for soft soils. International Journal of Lowland Technology, 9(2), 38-48
- Bergado, D.T., and **Abuel-Naga, H.M**. Thermo-mechanical behavior and stabilization of soft Bangkok clay. Geotechnical Engineering Journal of SEAGS, 38(3), 199-218.

2008

- **Abuel-Naga, H.M.**, Bergado, D.T., and Bouazza, A. Thermal Conductivity Evolution of Saturated Clay under Consolidation Process, International Journal of Geomechanics, ASCE, 8(2), 114-122.
- Bouazza, A., Vangpaisal, T., **Abuel-Naga, H.M**., and Kodikara, J. Analytical modelling of gas leakage rate through a geosynthetic clay liner-geomembrane composite liner due to a circular defect in the geomembrane. Geotextile and Geomembranes, 26, 122-129
- **Abuel-Naga, H.M**, Bouazza, A., Bowders, J., and Collazos, O. Numerical evaluation of prefabricated vertical drain enhanced soil vapour extraction system. Geosynthetics International 15(3), 216-223.

2009

- **Abuel-Naga, H.M.**, Bergado, D.T., and Bouazza, A., and Pender, M. Thermo-Mechanical Model for Saturated Clays. Ge´otechnique 59, No. 3, 273–278
- **Abuel-Naga, H.M**., Bergado, D.T., Bouazza, A. and Pender, M. Thermal Conductivity of Soft Bangkok Clay from laboratory and field measurements. Engineering Geology 105(3-4), 211–219.
- **Abuel-Naga, H.M**., and Bouazza, A. On the Equivalent Diameter of Prefabricated Vertical Drain: Numerical Study. Geotextile & Geomembranes 27(3), 227-231.
- **Abuel-Naga,H.M**. Innovative thermal consolidation technique for soft soils. NZ Geomechanics news, 77, 69-77.
- **Abuel-Naga, H.M**., and Bouazza, A. Numerical Characterization of Advective Gas Flow through GmGcl Composite Liners Having a Circular Defect in the Geomembrane. Journal of Geotechnical and Geoenvironmental Engineering, ASCE. 135(11), 1661-1672.

2010

- Trani, L.D, Bergado, D.T, and **Abuel-Naga, H.M**. Thermo-Mechanical Behaviour of Normally Consolidated Soft Bangkok Clay. International Journal of Geotechnical Engineering , 4(1), 31-44.
- Pothiraksanon, C., Saowapakpiboon, J., Bergado, D. T., Voottipruex, P., and **Abuel-Naga, H. M**. Soft ground improvement with solar-powered drainage. Ground Improvement, ICE, 163(1), 23 –30
- Pothiraksanon, C., Bergado, D.T., **Abuel-Naga, H.M**. Full-Scale Embankment Consolidation Test using Prefabricated Vertical Thermal Drains. Soils and Foundations,50(5), 599-608

- **Abuel-Naga, H.M.,** and Bouazza, A**.** A novel laboratory technique to determine the water retention curve of geosynthetic clay liners**. Geosynthetics International, 17(5), 1-10.**

2011

- **Abuel-Naga, H.M.**, and Bouazza, A. Effects of Temperature and Thermal Gradient on Thermocouple Psychrometer Measurements. Geotechnique, 61(10), 875 –885
- **Abuel-Naga, H.M**., Holtrigter, M., and Pender, M. Simple Method for Correcting Dynamic Cone Penetration Test Results for Rod Friction. Geotechnique Letters, 1, 37-40.
- **Abuel-Naga, H.M**., Bouazza, A., and Holtrigter, M. On use of dynamic probing in sandy soils. Lowland Technology International, 13(2), 41-51

2012

- **Abuel-Naga, H.M**., Pender, M.J., and Bergado, D.T. Design curves of prefabricated vertical drains including smear and transition zones effects. Geotextiles and Geomembranes, 32(5), 1-9.
- **Abuel-Naga, H.M**., Bouazza, A., and Lalot, E. On Measuring the Hydraulic Transmisivity of the Geotextile Cover of Geosynthetics Clay Liners. Geosynthetics International, 19, No. 4, 319–323
- **Abuel-Naga, H.M.**, Pender, M.J. Modified Terzaghi consolidation curves with effective stress dependent coefficient of consolidation, Geotechnique Letters 2, 43–48
- **Abuel-Naga, H.M**., Bouazza, A., and Bergado, D.T. Numerical Assessment of Equivalent Diameter Equations for Prefabricated Vertical Drains. Canadian Geotechnical Journal, 49(12): 1427-1433

2013

- **Abuel-Naga, H.M**., Bouazza, A. Thermo-mechanical behaviour of geosynthetics clay liners. Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 139(4), 539–547
- **Abuel-Naga, H.M**., Bouazza, A., Gates, W. Impact of Bentonite Form on the Thermal Evolution of the Hydraulic Conductivity of Geosynthetics Clay Liners, Geotechnique Letters 3, 26–30.
- **Abuel-Naga, H.M.**, Bouazza, A., and Bergado, D.T. Reply to Discussion of Numerical Assessment of Equivalent Diameter Equations for Prefabricate Vertical Drains. Canadian Geotechnical Journal, 50(7), 805.
- **Abuel-Naga, H.M**., Bouazza, A., and Bergado, D.T. Erratum: Numerical assessment of equivalent diameter equations for prefabricated vertical drains. Canadian Geotechnical Journal, 50(7): 806
- **Abuel-Naga, H.M**., Lorenzo, G.A., and Bergado, D.T. Current state of knowledge on Thermal Consolidation using Prefabricated Vertical Drains, Geotechnical Engineering Journal of SEAGS, 44(4), 132-141.

2014

- **Abuel-Naga, H.M**., Bouazza, A. Numerical experiment-artificial intelligence approach to develop empirical equations for predicting leakage rates through GM/GCL composite liners, Geotextiles and Geomembranes, 42(3): 236-245
- **Abuel-Naga, H.M**., Shaia, H. Interface Friction Evolution of FRP-tube Confined Concrete Piles during the Driving Installation Process, Geotechnique letter, 4(1): 52-56.
- **Abuel-Naga, H.M**., Shaia, H. On the Normalized Relative Roughness for Soil-Fiber Reinforced Polymer Interface Shear Behaviour, Lowland Technology International, 16(1):9-13
- Laloui, L., Olgun, C.G., Sutman, M., McCartney, J.S., Coccia,C. J., **Abuel-Naga**, **H. M.,** Bowers, G. A ., Issues involved with thermoactive geotechnical systems: characterization of thermomechanical soil behavior and soil-structure interface behavior, The Journal of the Deep Foundations Institute, 8(2), 108-120.

2015

- **Abuel-Naga, H.M**., Raouf, M., Raouf, A., Naser, A.G. Energy piles: current state of knowledge and design challenges, Environmental Geotechnics, ICE (DOI: 10.1680/envgeo.13.00019)

Research projects

Available postgraduate research projects:

- Electro-osmisis consolidation of clays (PhD)
- Thermo-hydro-mechanical behaviour of compacted clays (PhD)
- Thermo-mechanical behaviour of energy piles (PhD)
- Temperature effects on interface shear behaviour between geosynthetics and soils (PhD)
- Advanced design curves for Prefabricated Vertical Drains improved ground (ME)
- Consolidation curves for soil–cement pile improved ground (ME)
- Simple approach for numerical modelling of Prefabricated Vertical Drains improved ground (ME)
- Behaviour of smear zone around Prefabricated Vertical Drains (ME)
- Volumetric thermal expansion coefficient of soil particles (ME)
- Numerical solution for one-dimensional consolidation for soft sensitive clays (ME)