

## REFERENCES

- Adhikary, D.P. and Dyskin A.V. 1997. A Cosserat continuum model for layered materials. Computers and Geotechnics. 20(1): 15-45.
- Agarwal, T.K. and Ishibashi, I. 1991. Multi-Directional wave velocity by piezoelectric crystals, Proceedings of Recent Advances in Instrumentation, Data Acquisition and Testing in Soil Dynamics (GSP 29). ASCE: 102-117. Florida. October 20-24, 1991.
- Aifantis, E.C. 1984. On the microstructural origin of certain inelastic models. Journal of Engineering Materials and Technology. 106(4): 326-330. ASME.
- Aifantis, E.C. 1987. The physics of plastic deformation. International Journal of Plasticity. 3: 211-247.
- Alshibli, K.A. 1995. Localized deformations in granular materials. Ph.D Dissertation, University of Colorado at Boulder, Colorado.
- Alshibli, K.A. and Sture S. 1999. Sand Shear Band Thickness Measurement by Digital Image Techniques. Journal of Computing in Civil Engineering. 13(2): 103-109. ASCE.
- Alshibli, K.A. and Sture S. 2000. Shear Band Formation in Plane Strain Experiments of Sand. Journal of Geotechnical and Geoenvironmental Engineering. 126 (6): 495-503. ASCE.
- Alshibli, K.A., Sture, S., Costes, N.C., Frank, M.L., Lankton, M.R., Batiste, S.N., and Swanson, R.A. 2000. Assessment of localized deformations in sand using X - Ray computed tomography, Geotechnical Testing Journal. 23(3): 274-299.
- Alshibli, K.A., Batiste, S.N., and Sture, S. 2003. Strain Localization in Sand: Plane Strain versus Triaxial Compression. Journal of Geotechnical and Geoenvironmental Engineering. (129)6: 483-494. ASCE.
- Arroyo, M., Muir Wood, D., and Greening, P.D. 2003. Source near-field effects and pulse tests in soil samples. Géotechnique. 53(3): 337-345.
- Arroyo, M., Muir Wood, D., Greening, P.D., Medina, L., and Rio, J. 2006. Effects of sample size on bender-based axial  $G_0$  measurements. Géotechnique. 56(1): 39-52.

- Arthur, J., Dunstan, T., Al-ani, Q., and Assadi A. 1977. Plastic deformation and failure in granular media. Géotechnique. 27(1): 53-74.
- Arthur, J. and Dunstan, T. 1982. Rupture layers in granular media. in Vermeer P.A. and Luger H.J. (Eds). Proceedings of IUTAM Conference Deformation and Failures of Granular Materials, 453-459. Rotterdam, The Netherlands: Balkema.
- Arulnathan, R., Boulanger, R.W., and Riemer, M.F. 1998. Analysis of bender element test. Geotechnical Testing Journal. 21(2): 120-131.
- Bardet, J.P. 1990. A comprehensive review of strain localization in elastoplastic soils. Computer and Geotechnics. (10)3: 163-188.
- Bates, C.R. 1989. Dynamic soil property measurements during triaxial testing. Géotechnique. 39(4): 712-726.
- Batiste, S.N., Alshibli, K.A., Sture S. and Lankton, M. 2004. Shear band characterization of triaxial sand specimens using computed tomography. Geotechnical Testing Journal. 27(6): 568-579.
- Bauer, E. 1996. Calibration of a comprehensive hypoplastic model for granular materials. Soils and Foundations. 36(1): 13-26.
- Bauer, E. 1999. Analysis of shear band bifurcation with a hypoplastic model for a pressure and density sensitive granular material. Mechanics of Materials. 31: 597-609.
- Bellotti, R., Jamiolkowski, M., Lo Presti, D. C. F., and O'Neill, D.A. 1996. Anisotropy of small strain stiffness in Ticino sand. Géotechnique. 46(1): 115-131.
- Benallal, A. and Comi C. 2003. Perturbation growth and localization in fluid-saturated inelastic porous media under quasi-static loadings. Journal of the Mechanics and Physics of Solids. 51: 851-899.
- Bésuelle, P., Desrues, J., and Raines S. 2000. Experimental characterisation of the localization phenomenon inside a vosges sandstone in a triaxial cell. International Journal of Rock Mechanics and Mining Sciences. 37: 1223-37.
- Blewett, J., Blewett, I. J., and Woodward, P. K. 1999. Measurement of shear-wave velocity using phase-sensitive detection techniques. Canadian Geotechnical Journal. 36(5): 934-939.



- Brignoli, E.G.M., Gotti, M., and Stokoe, K.H., II. 1996. Measurement of shear waves in laboratory specimens by means of piezoelectric transducers. Geotechnical Testing Journal. 19(4): 384-397.
- Brocanelli, D. and Rinaldi, V. 1998. Measurement of Low-Strain Material Damping and Wave Velocity with Bender Elements in the Frequency Domain. Canadian Geotechnical Journal. 35(6): 1032-1040.
- Butterfield, R., Harkness, R.M., and Andrews, K.Z. 1970. A stereo-photogrammetric method for measuring displacements fields. Géotechnique. 20(3):308-314.
- Cascante, G. and Santamarina, J.C. 1996. Interparticle Contact Behavior and Wave Propagation. Journal of Geotechnical Engineering. (122)10: 831-839. ASCE.
- Chambon, R., Crochepeyre S., and Desrues J. 2000. Localization criteria for nonlinear constitutive equations of geomaterials. Mechanics of Cohesive-Frictional Materials. 5: 561-582.
- Chambon, R., Caillerie, D., and Matsushima, T. 2001. Plastic continuum with microstructure, local second gradient theories for geomaterials: Localization studies. International Journal of Solids and Structures. 38: 8503-8527.
- Chau, K.T. 1992. Non-normality and bifurcation in a compressible pressure-sensitive circular cylinder under axisymmetric tension and compression. Journal of Solids Structures. 29(7): 801-824.
- Cheng, S.Y., Ariaratnam, S.T., and Dubey, R.N. 1971. Axisymmetric bifurcation in an elastic-plastic cylinder under axial load and lateral hydrostatic pressure. Quarterly of Applied Mathematics. 29: 41-51.
- Desrues, J., Lanier, J., and Stutter P. 1985. Localization of the deformation in tests on sand sample. Engineering Fracture Mechanics. 21: 909-921.
- Desrues, J. and Chambon R. 1989. Shear band analysis for granular materials: the question of incremental nonlinearity. Ingenieur Archiv. 59: 187-196.
- Desrues, J. and Hammad, W. 1989. Shear band dependency on mean stress level in sand. in Dembicki, E., Gudehus, G., and Sicker, Z. (Eds). 2<sup>nd</sup> International Workshop on Numerical Methods for Localization and Bifurcation of Granular Bodies, 57-67. Technical University of Gdansk: Gdansk, Poland.

- Desrues, J. 1990. Shear Band Initiation in Granular Materials: Experimentation and Theory. Geomaterials: Constitutive Equations and Modeling. 283-310. Elsevier: Routledge, UK.
- Desrues, J., Chambon, R., Mokni, M., and Mazerolle F. 1996. Void ratio evolution inside shear bands in triaxial sand specimens studied by computed tomography. Géotechnique. 46(3): 529-546.
- Desrues, J. 1998. Localization Patterns in ductile and brittle geomaterials. in Material Instabilities in Solids, René de Borst and Erik van der Giessen (Eds). Wiley-Interscience-Europe. 137-158
- Desrues, J. and Chambon R. 2002. Shear bands analysis and shear moduli calibration. International Journal of Solids and Structures. 39(13-14), 3757-3776.
- Desrues, J. and Viggiani G. 2004. Strain localization in sand: an overview of the experimental results obtained in Grenoble using stereophotogrammetry. International Journal for Numerical and Analytical Methods in Geomechanics. 28(4): 279-321.
- Desrues, J. 2004. Tracking strain localization in geomaterials using computerized tomography. in Omani, J. and Obara, Y. (Eds). Proceedings of the International Workshop on X-ray CT for Geomaterials, 15-41. International Workshop on X-ray CT for Geomaterials, November 6-7, 2003. Kumamoto, Japan. Balkema.
- Dyvik, R. and Madhus, C. 1985. Laboratory measurement of  $G_{max}$  using bender element. Proceedings of ASCE Annual Convention: Advance in the Art of Testing Soils under Cyclic Conditions, 186 – 96.89 (SM1): 33-65. Detroit.
- Ehlers, W. and Volk, W. 1997. On shear band localization phenomena of liquid-saturated granular elastoplastic porous solid materials accounting for fluid viscosity and micropolar solid rotations. Mechanics of cohesive-frictional materials. 2: 301-320.
- Ehlers, W. and Volk, W. 1998. On theoretical and numerical methods in the theory of porous media based on polar and non-polar elastoplastic solid materials. International Journal of Solids and Structures. 35 (34-35): 4597-4617.



- Finno, R., Harris, W., Mooney, M., and Vagina G. 1996. Strain localization and undrained steady state of sands. Journal of Geotechnical Engineering. 122(6): 462-473. ASCE.
- Finno, R., Harris, W., Mooney, M., and Vagina G. 1997. Shear bands in plane strain compression of loose sand. Géotechnique 47(1): 149-165.
- Frost J.D. and Deh-Jeng Jang. 2000. Evolution of Sand Microstructure during Shear. Journal of Geotechnical and Geoenvironmental Engineering. (126)2: 116-130. ASCE.
- Gajo, A., Fedel, A., and Mongiovi, L. 1997. Experimental analysis of the effects of fluid-solid coupling on the velocity of elastic waves in saturated porous media. Géotechnique, 47(5): 993-1008.
- Han, C. and Vardoulakis I. 1991. Plane-strain compression experiments on water-saturated fine-grained sand. Géotechnique. 41(1): 49-78.
- Hardin, B.O. and Richart, F.E. 1963. Elastic Wave Velocities in Granular Soils. Journal of Soil Mechanics and Foundations Division. (89)SM1: 33-65. ASCE.
- Hardin, B.O. and Drnevich, V.P. 1972. Shear modulus and damping in soils: measurements and parameter effects. Journal of Soil Mechanics and Foundations Division. Terzaghi Lecture, 98(6): 603-624.
- Hicher, P.Y., Wahyudi, H., and Tessier, D. 1994. Microstructural analysis of strain localisation in clay. Computers and Geotechnics. 16: 205-222.
- Huang, W., Nubel, K., and Bauer, E., 2002. Polar extension of a hypoplastic model for granular materials with shear localization. Mechanics of Materials. 34(9): 563-576.
- Huang, W. and Bauer, E. 2003. Numerical investigations of shear localization in a micro-polar hypoplastic material. International Journal for Numerical and Analytical Methods in Geomechanics. 27(4): 325-352.
- Ikeda, K., Murota, K., Yamakawa, Y., and Yanagisawa, E. 1997. Mode switching and recursive bifurcation in granular materials.” Journal of the Mechanics and Physics of Solids. 45(11/12): 1929-1953.
- Ishihara, K. 1996. Soil Behaviour in Earthquake Geotechnics. Oxford University Press. 360 pages.

- Iwasaki, T., Tatsuoka, F., and Takagi, Y. 1978. Shear moduli of sands under cyclic torsional shear loading. Soils and Foundations. 18(1): 39-56.
- Jovicic, V., Coop, M.R., and Simic, M. 1996. Objective criteria for determining  $G_{max}$  from bender element tests. Géotechnique. 46(2): 357-362.
- Kanatani, K.I. 1979. A Micropolar continuum theory for the flow of granular materials. International Journal of Engineering Science. 17: 419-432.
- Kawaguchi, T., Mitachi, T., and Shibuya, S. 2001. Evaluation of shear wave travel time in laboratory bender element test. Proceedings of the 15<sup>th</sup> International Conference on Soil Mechanics and Geotechnical Engineering, 155-158. Istanbul.
- Kumar, J., and Madhusudhan, B. N. 2010 A note on the measurement of travel times using bender and extender elements. Soil Dynamics and Earthquake Engineering. 30(2010): 630-634.
- Lade, P.V. and Duncan, J.M. 1973. Cubical triaxial tests on cohesionless soil. Journal of Soil Mechanics and Foundations Division. 99(SM10): 793-812. ASCE.
- Lade, P.V. 2002. Instability, shear banding and failure in granular materials. International Journal of Solids and Structures. 39: 3337-3357.
- Lam, W.K. and Tatsuoka, F. 1988. Triaxial compression and extension strength of sand affected by strength anisotropy and sample slenderness. Advance in Triaxial Testing of Soil and Rock, 655-666. ASTM STP 977. Philadelphia.
- Lawrence, F.V. 1963. Propagation of Ultrasonic Waves Through Sand. Research Report R63-08. Massachusetts Institute of Technology: Boston.
- Lawrence, F.V. 1965. Ultrasonic Shear Wave Velocity in Sand and Clay, Research Report R65-05. Massachusetts Institute of Technology: Boston.
- Lee, K. 1970. Comparison of plane strain and triaxial tests on sand. Journal of Soil Mechanics and Foundations Division. 96(3): 901-923. ASCE.
- Lee J.S. and Santamarina J.C. 2005. Bender Elements: Performance and Signal Interpretation. Journal of Geotechnical and Geoenvironmental Engineering. 131(9): 1063-1070.
- Leong, E.C., Yeo, S.H., and Rahardjo, H. 2005. Measuring shear wave velocity using bender elements. Geotechnical Testing Journal. 28(5): 488-498.



- Marachi, N., Duncan, J., Chan, C., and Seed, H. 1981. Plane-strain testing of sand.” Laboratory shear strength of soils, ASTM STP 740, R. N. Yong, and F. C. Townsend, eds., ASTM, 294-302.
- Minsu Cha and Gye-Chun Cho. 2007. Shear strength estimation of sandy soils using shear wave velocity. Geotechnical Testing Journal. 30(6): 484-495.
- Mokni, M. and Desrues J. 1999. Strain localisation measurements in undrained plane- strain biaxial tests on Hostun RF sand. Mechanics of Cohesive-Frictional Materials. 4: 419-441.
- Mooney, M.A. 1996. An experimental study of strain localization and the mechanical behavior of sand. Ph.D Thesis, Northwestern University, Evanston, Illinois.
- Mühlhaus, H.-B. and Vardoulakis, I. 1987. The thickness of shear bands in granular materials. Géotechnique. 37: 271-283.
- Mühlhaus, H.-B. and Hornby, P. 2001. Energy and averages in the mechanics of granular materials. Tectonophysics. 335: 63-80.
- Nakai, T. and Matsuoka, H. 1983. Shear behavior of sand and clay under three-dimensional stress condition. Soils and Foundations. 23(2): 26-47.
- Oda, M. 1972b. The Mechanism Fabric Changes during Compressional Deformation on Sand. Soils and Foundations. 12(2): 1-18.
- Oda, M., Iwashita, I., and Kazama, H. 1996. Micro-structure developed in shear band of dense granular soils and its computer simulation - mechanisms of dilatancy and failure. IUTAM symposium on Mechanics of Granular and Porous Materials. UK 96: 353-364.
- Oda, M., Kazama, H., and Konishi, J. 1998. Effects of induced anisotropy on the development of shear bands in granular materials. Mechanics of Materials. 28: 103-111.
- Oda, M. and Kazama, H. 1998. Microstructure of shear bands and its relation to the mechanisms of dilatancy and failure of dense granular soils. Géotechnique. 48(4): 465-481.
- Oda, M. and Iwashita, I. 1999. Mechanics of Granular Materials: An Introduction. A. A. Balkema: The Netherlands.

- Oka, F., Jiang, M., and Higo, Y. 2001. Gradient dependent viscoplastic constitutive models and strain localization analysis of water saturated cohesive soil. Computer Methods and Advances in Geomechanics, 519-524.
- Parry R.H.G. 1995. Mohr Circles, Stress Paths and Geotechnics, E & FN SPON, 230 pages
- Pasternak, E. and Mühlhaus, H.-B. 2001. Cosserat continuum modeling of granulate materials. Computational Mechanics – New Frontiers for New Millennium, 1189-1194.
- Pasternak, E. and Mühlhaus, H.-B. 2002. Large deformation Cosserat continuum modeling of granulate materials. Proceedings of the third Australasian Congress on Applied Mechanics, Applied Mechanics: Progress and Applications, 389-396.
- Pennington, D.S., Nash, D.F.T., and Lings, M.L. 2001. Horizontally mounted bender elements for measuring anisotropic shear moduli in Triaxial clay specimens. Geotechnical Testing Journal. 24(2): 133-144.
- Peters, J., Lade, P., and Bro, A. 1988. Shear band formation in triaxial and plane strain tests. in Donaghe, R., Chaney, R., and Silver, M. (Eds). Advanced Triaxial Testing of Soil and Rock, 604-627. ASTM, STP 977.
- Rechenmacher, A.L. and Finno, R.J. 2004. Digital image correlation to evaluate shear banding in dilative sands. Geotechnical Testing Journal. 27(1): 13-22.
- Rained S., Faber D., Frédéric M., Geraud Y., and Later H.J. 1989. Analysis of the internal structure of rocks and characterization of mechanical deformation by a non-destructive method: X-ray tomodensitometry. Tectonophysics. 159(1-2): 149-159.
- Reades, D.W. and Green, G.E. 1976. Independent stress control and triaxial extension tests on sand. Géotechnique. 26(4): 551-576.
- Richart, F.E., Hall, J.R., and Woods, R.D. 1970. Vibrations of Soils and Foundations. Prentice-Hall, Englewood Cliffs, N.J.
- Ristinmaa, M. and Vecchi, M. 1996. Use of couple-stress theory in elasto-plasticity. Computer Method in Applied Mechanics and Engineering. 136: 205-224.
- Roesler, S.K. 1979. Anisotropic shear modulus due to stress anisotropy. Journal of Soil Mechanics and Foundations Division. 105(7): 871-880.



- Roger, V., Desrues, J., and Vagina, G. 1998. Experiments on strain localisation in dense sand under isotropic conditions. Localisation and Bifurcation Theory for Soils and Rocks, 239-248. 4<sup>th</sup> Workshop on Localization and Bifurcation Theory for Soils and Rocks, 28 September - 2 October 1997, Gifu, Japan.
- Roscoe, K.H., Schofield A.N., and Thurairajah A. 1963. An evaluation of test data for selecting a yield criterion for soils. Laboratory Shear Testing of Soils. STP No. 3. ASTM: Philadelphia, PA.
- Roscoe, K.H. 1970. The influence of strains in soil mechanics. Géotechnique. 20(2): 129-170.
- Rowe, P.W. 1962. The stress-dilatancy relation for static equilibrium of an assembly of particles in contact. Proceedings of the Royal Society of London, series A, Mathematical and Physical Sciences (1934-1990). Volume 269 Number 1339.
- Saada, A.S., Liang, L., Figueroa, J.L., and Cope, C.T. 1999. Bifurcation and shear band propagation in sands. Géotechnique. 49(3): 367-385.
- Sachan, A. and Penumadu, D. 2007. Strain localization in solid cylindrical clay specimens using Digital Image Analysis (DIA) technique. Soils and Foundations. 47(1): 67-78.
- Sanchez-Salinerio, I., Roesset, J.M., and Stokoe, K.H. 1986. Analytical studies of body wave propagation and attenuation. Report GR 86-15. Civil Engineering Department, University of Texas at Austin, TX.
- Santamarina, J.C. and Fam, M.A. 1997. Interpretation of bender element tests (Discussion). Géotechnique, 47(4): 873-877.
- Santamarina J.C., Klein K.A., and Fam, M.A. 2001. Soils and Waves: Particulate Materials Behaviour, Characterisation and Process Monitoring. J. Wiley & Sons, 508 pages.
- Santamarina, J.C. and Cascante, G. 1996. Stress anisotropy and wave propagation - A micromechanical view. Canadian Geotechnical Journal. 33(5): 770-782.
- Schrefler, B., Sanavia, L., and Majorcan C. 1996. A multiphase medium model for localization and post localisation simulation in geomaterials. Mechanics of Cohesive-Frictional Materials. 1: 95-114.

- Shi, M.X., Huang, Y., and Hwang, K.C. 2000. Plastic flow localization in mechanism-based strain gradient plasticity. International Journal of Mechanical Sciences. 42: 2115-2131.
- Shirley, D. J. 1978. An improved shear wave transducer. Journal of Acoustic Society of America. 63(5), 1643-1645.
- Stokoe, K.H. II, Hwang, S.K., Lee, J.N.K., and Andrus, R.D. 1995. Effects of various parameters on the stiffness and damping of soils at small to medium strains. in Shibuya *et al.* (Eds). Proceedings of the International Symposium on Pre-failure Deformation of Geomaterials. 2: 785-816.
- Sulem, J. and Vardoulakis, I. 1990. Bifurcation analysis of the triaxial test on rock specimens: A theoretical model for shape and size effect. Acta Mechanica. 83: 195-212.
- Tamagnini, C., Viggiani, G., and Chambon, R. 2000. A review of two different approaches to hypoplasticity. in Kolymbas, D. (Ed.) Constitutive Modeling of Granular Materials, 107-145. Springer: Berlin.
- Tamagnini, C., Viggiani, G., and Chambon, R. 2001. Some remarks on shear band analysis in hypoplasticity. in Mühlhaus, Dyskin and Pasternak (Eds). 5<sup>th</sup> International Workshop on Localisation and Bifurcation Theory in Geomechanics, 85-93. Balkema Publisher.
- Tan, S. and Fwa, T. 1991. Influence of voids on density measurements of granular materials using gamma radiation techniques. Geotechnical Testing journal. 14(3): 257-265.
- Tatsuoka, F., Sakamoto, M., Kawamura, T., and Fukushima S. 1986. Strength and deformation characteristics of sand in plane strain compression at extremely low pressures. Soils and Foundations. 26(1): 65-84.
- Tatsuoka, F., Nakamura, T., Huang, C., and Tani K. 1990. Strength anisotropy and shear band direction in plane strain test of sand. Soils and Foundations. 30(1): 35-54.
- Teachavorasinskun, S. and Akkarakun, T. 2004. Paths of elastic shear modulus of clays," Géotechnique. 54(5): 331-333.



- Teachavorasinskun, S. and Amornwithayalax, T. 2002. Elastic shear modulus of Bangkok clay during undrained triaxial compression. Géotechnique. 52(7): 537-540.
- Tejchman, J. and Bauer E. 1996. Numerical Simulation of Shear Band Formation with a Polar Hypoplastic Constitutive Model. Computers and Geotechnics. 19(3): 221-244.
- Tejchman, J. and Wu, W. 1996. Numerical simulation of shear band formation with a hypoplastic constitutive model. Computers and Geotechnics. 18(1): 71-84.
- Tejchman, J. and Gudehus, G. 2001. Shearing of a narrow granular layer with polar quantities. International Journal for Numerical and Analytical Methods in Geomechanics. 25: 1-28.
- Tejchman, J. and Poland, G. 2001. Patterns of shear zones in granular bodies within a polar hypoplastic continuum. Acta mechanica. 1-24.
- Vardoulakis, I. 1977. Scherfugenbildung in Sandkörpern als Verzweigungsproblem. Ph.D Thesis (Nr. 77), Institute for Soil and Rock Mechanics, University of Karlsruhe.
- Vardoulakis, I., Goldscheider, M., and Gudehus, G. 1978. Formation of shear bands in sand bodies as a bifurcation problem. International Journal for Numerical and Analytical Methods in Geomechanics. 2(2): 99-128.
- Vardoulakis, I. 1979. Bifurcation analysis of the triaxial test on sand samples. Acta mechanica. 32: 35-54.
- Vardoulakis, I. 1980. Shear band inclination and shear modulus of sand in biaxial tests. International Journal for Numerical and Analytical Methods in Geomechanics. 4: 103-119.
- Vardoulakis, I. 1981. Constitutive properties of dry sand observable in the triaxial test. Acta mechanica. 38: 219-239.
- Vardoulakis, I. 1983. Rigid granular plasticity model and bifurcation in the triaxial test. Acta mechanica, 49: 57-79.
- Vardoulakis, I. and Graf B. 1985. Calibration of constitutive models for granular materials using data from biaxial experiments. Géotechnique. 35(3): 299-317.
- Vardoulakis, I. 1989. Shear-band and liquefaction in granular materials on the basis of Cosserat continuum theory. Ingenieur-Archiv. 59: 106-113.

- Vardoulakis, I. and Aifantis, E.C. 1989. Gradient dependent dilatancy and its implications in shear banding and liquefaction. Ingenieur-Archiv. 59: 197-208.
- Vardoulakis, I. and Aifantis, E.C. 1991. A gradient flow theory of plasticity for granular materials. Acta mechanica. 87: 197-217.
- Vardoulakis, I. and Sulem, J. 1995. Bifurcation Analysis in Geomechanics. Blackie Academic and Professional: Chapman & Hall, 462 pages.
- Vardoulakis, I. 1996a. Deformation of water-saturated sand: I. Uniform undrained deformation and shear banding. Géotechnique. 46(3): 441-456.
- Vardoulakis, I. 1996b. Deformation of water-saturated sand: II. Effect of pore water flow and shear banding. Géotechnique. 46(3): 457-472.
- Vermeer P.A. 1982. A simple shear band analysis using compliances. in Vermeer P.A. and Luger H.J. (Eds). Proceedings of IUTAM Conference Deformation and Failures of Granular Materials, 493-499. Rotterdam, The Netherlands: Balkema.
- Viggiani, G., Küntz, M., and Desrues, J. 2001. An experimental investigation of the relationships between grain size distribution and shear banding in sand. Continuous and Discontinuous Modeling of Cohesive-Frictional Materials. Springer: Lecture notes in physics, Vol. 568.
- Viggiani, G. and Atkinson, J.H. 1995. Interpretation of bender element tests. Géotechnique. 45(1): 149-154.
- Vinegar H.J., De Waal J.A., and Wellington S.L. 1991. CT Studies of Brittle Failure in Castlegate Sandstone. International Journal of Rock Mechanics and Mining Science & Geomechanics Abstracts. 28(5): 441-448.
- Yamamuro, J.A. and Lade, P.V. 1995. Strain localization in extension tests on granular materials. Journal of Engineering Mechanics. 121(7), 828-836. ASCE.
- Yang, F., Chong, A.C.M., Lam, D.C.C., and Tong, P. 2002. Couple stress based strain gradient theory for elasticity. International Journal of Solids and Structures. 39: 2731-2743.
- Zbib, H.M. and Aifantis, E.C. 1988. On the structure and width of shear bands. Scripta Metallurgica. 22(5): 703-708.





## BIOGRAPHY

Pulpong Pongvithayapanu was born in 1975 in Kanchanaburi Province. He obtained his Bachelor degree program in civil engineering from Sirindhorn International Institute of Technology (SIIT), Thammasat University in 1999. He had worked at Italian-Thai Development public company limited for 6 months before pursuing in the Master degree program in civil engineering at SIIT, TU in 2002. During his Master study, he had gotten the SIIT partial scholarship and worked as a teaching and research assistant to the department of civil engineering. After graduated, he had become a lecturer at South-East Asia University for 5 years and then moved to Kasetsart University, Si Racha campus in 2007. In 2006, he attained the graduate school of civil engineering at Chulalongkorn University with scholarship supported by the Commission on Higher Education, Ministry of Education under Faculty Development Scholarship Program with the collaboration of AUN/SEED-Net. In May 2009 to March 2010, he had joined the Geotechnical Engineering Division, Faculty of Civil Engineering, Graduate School of Science and Engineering, Yamaguchi University, Japan, as a foreign researcher under the supervision of Professor Masayuki Hyodo.



