

Design and Performance of Helical Anchors in Soil

(A Bibliography of the Technical Literature)

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Adams, J.I. and Hayes, D.C., 1967. The Uplift Capacity of Shallow Foundations. *Ontario Hydro Research Quarterly*, Vol. 19, No. 1, pp. 1-13.

Adams, J.I. and Klym, T.W., 1972. A Study of Anchors for Transmission Tower Foundations. *Canadian Geotechnical Journal*, Vol. 9, No. 1, pp. 89-104.

Bobbitt, D.W., and Clemence, S.P., 1987. Helical Anchors: Application and Design Criteria. *Proceedings of the 9th Southeast Asian Geotechnical Conference*, Vol. 2, pp. 6-105 - 6-120.

Carville, C.A. and Walton, R.W., 1994. Design Guidelines for Screw Anchors. *Proceedings of the International Conference on Design and Construction of Deep Foundations*, Vol. 2, pp. 646-655.

Carville, C.A. and Walton, R.W., 1995. Foundation Repair Using Helical Screw Anchors. *Foundation Upgrading and Repair for Infrastructure Improvement*, ASCE, pp. 56-75.

Chapel, Thomas A., *Field Investigation of Helical and Concrete Piers in Expansive Soils*, Colorado State University Master s Thesis, 1998, Ft. Collins, CO.

Clemence, S.P., 1984. The Uplift and Bearing Capacity of Helix Anchors in Soil. *Vols. 1,2 & 3, Contract Report TT112-1 Niagra Mohawk Power Corporation*, Syracuse, N.Y.

Clemence, S.P., Crouch, L.K., and Stephenson, R.W., 1994. Uplift Capacity of Helical Anchors in Soils. *Proceedings of the 2nd Geotechnical Engineering Conference*, Cairo, Vol. 1, pp. 332-343.

Clemence, S.P. and Pepe, F.D. Jr., 1984. Measurement of Lateral Stress Around Multi-Helix Anchors in Sand. *Geotechnical Testing Journal*, Vol. 7, No. 3, pp. 145-152.

Clemence, S.P. and Smithling, A.P., 1984. Dynamic Uplift Capacity of Helical Anchors in Sand. *Proceedings of the 4th Australia-New Zealand Conference on Geomechanics*, Vol. 1, pp. 88-93.

Curle, R., 1995. Screw Anchors Economically Control Pipeline Bouyancy in Muskeg. *Oil and Gas Journal*, Vol. 93, No. 17, pp.

Ghaly, A., Hanna, A., Ranjan, G. and Hanna, M., 1991. Helical Anchors in Dry and Submerged Sand Subjected to Surcharge. *Journal of Geotechnical Engineering*, ASCE, Vol. 117, No. 10, pp. 1463-1470.

Ghaly, A., Hanna, A., Ranjan, G. and Hanna, M., 1991. closure to Helical Anchors in Dry and Submerged Sand Subjected to Surcharge. *Journal of Geotechnical Engineering*, ASCE, Vol. 119, No. 2, pp. 392-394.

Ghaly, A., Hanna, A., and Hanna, M., 1991. Installation Torque of Screw Anchors in Dry Sand. *Soils and Foundations*, Vol. 31, No. 2, pp. 77-92.

Ghaly, A.M., Hanna, A.M. and Hanna, M.S., 1991. Uplift Behavior of Screw Anchors in Sand - I: Dry Sand. *Journal of Geotechnical Engineering*, ASCE, Vol. 117, No. 5, pp. 773-793.

Ghaly, A.M., Hanna, A.M. and Hanna, M.S., 1991. closure to Uplift Behavior of Screw Anchors in Sand - I: Dry Sand. *Journal of Geotechnical Engineering*, ASCE, Vol. 118, No. 9, pp. 1476-1478.

Ghaly, A.M. and Clemence, S.P., 1998. Pullout Performance of Inclined Helical Screw Anchors in Sand. *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, Vol. 124, No. 7, pp. 617-627.

Ghaly, A.M. and Clemence, S.P., 1999. closure to Pullout Performance of Inclined Helical Screw Anchors in Sand. *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, Vol. 125, No. 12, pp. 1102-1104.

Ghaly, A.M., Hanna, A.M. and Hanna, M.S., 1991. Uplift Behavior of Screw Anchors in Sand - II: Hydrostatic and Flow Conditions. *Journal of Geotechnical Engineering*, ASCE, Vol. 117, No. 5, pp. 794-808.

Ghaly, A.M. and Hanna, A.M., 1991. Experimental and Theoretical Studies on Installation Torque of Screw Anchors. *Canadian Geotechnical Journal*, Vol. 28, No. 3, pp. 353-364.

Ghaly, A.M. and Hanna, A.M., 1991. Stress Development in Sand Due To Installation and Uplifting of Screw Anchors. *Proceedings of the 4th International Conference on Piling and Deep Foundations*, Vol. 1, pp. 565-570.

Ghaly, A.M. and Hanna, A.M., 1992. Stress and Strains Around Helical Screw Anchors in Sand. *Soils and Foundation*, Vol. 32, No. 4, pp. 27-42.

Ghaly, A.M. and Hanna, A.M., 1994. Model Investigation of the Performance of Single Anchors and Groups of Anchors. *Canadian Geotechnical Journal*, Vol. 31, pp. 273-284.

Ghaly, A.M. and Hanna, A., 1994. Ultimate Pullout Resistance of Single Vertical Anchors. *Canadian Geotechnical Journal*, Vol. 31, No. 5, pp. 661-672.

Hanna, A. and Ghaly, A., 1992. Effects of K_0 and Overconsolidation on Uplift Capacity. *Journal of Geotechnical Engineering*, ASCE, Vol. 118, No. 9, pp. 1449-1469.

Hanna, A. and Ghaly, A., 1994. Ultimate Pullout Resistance of Groups of Vertical Anchors. *Canadian Geotechnical Journal*, Vol. 31, No. 5, pp. 673-682.

Hargrave, R.L. and Thorsten, R.E., 1992. Helical Piers in Expansive Soils of Dallas, Texas. *Proceedings of the 7th International Conference on Expansive Soils*.

Hovland, H.J., 1993. discussion of Helical Anchors in Dry and Submerged Sand Subjected to Surcharge. *Journal of Geotechnical Engineering*, ASCE, Vol. 119, No. 2, pp. 391-392.

Hoyt, R.M. and Clemence, S.P., 1989. Uplift Capacity of Helical Anchors in Soil. *Proceedings of the 12th International Conference on Soil Mechanics and Foundation Engineering*, Vol. 2, pp. 1019-1022.

- Hoyt, R., Seider, G., Reese, L.C., and Wang, S.T., 1995. Buckling of Helical Anchors Used for Underpinning. *Foundation Upgrading and Repair for Infrastructure Improvement*, ASCE, pp. 89-108.
- Huang, F.C., Mohmood, I., Joolazadeh, M., and Axten, G.W., 1995. Design Considerations and Field Load Tests of a Helical Anchoring System for Foundation Renovation. *Foundation Upgrading and Repair for Infrastructure Improvement*, ASCE, pp. 76-88.
- Johnston, G.H. and Ladanyi, B., 1974. Field Tests of Deep Power-Installed Screw Anchors in Permafrost. *Canadian Geotechnical Journal*, Vol. 11, No. 3, pp. 348-359.
- Klym, T.W., Radhakrishna, H.S., and Howard, K., 19???. Helical Plate Anchors for Tower Foundations. *Proceedings of the 25th Canadian Geotechnical Conference*, pp. 141-159.
- Lutenegger, A.J., Smith, B.L. and Kabir, M.G., 1988. Use of In Situ Tests to Predict Uplift Performance of Multi-Helix Anchors. *Special Topics in Foundations*, ASCE, pp. 93-110.
- McDonald, J.K., 1999. discussion of Pullout Performance of Inclined Helical Screw Anchors in Sand. *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, Vol. 125, No. 12, p. 1102.
- Mitsch, M.P. and Clemence, S.P., 1985. The Uplift Capacity of Helix Anchors and Sand. *Uplift Behavior of Anchor Foundations in Soil*, ASCE, pp. 26-47.
- Mooney, J.S., Adamczak, S.Jr., and Clemence, S.P., 1985. Uplift Capacity of Helix Anchors in Clay and Silt. *Uplift Behavior of Anchor Foundations in Soil*, ASCE, pp. 48-72.
- Narasimha Rao, .S., Prasad, Y.V.S.N., Shetty, M.D. and Joshi, V.V., 1989. Uplift Capacity of Screw Pile Anchors. *Geotechnical Engineering*, Vol. 20, No. 2, pp. 139-159.
- Narasimha Rao, S., Prasad, Y.V.S.N., and Prasad, C.V., 1990. Experimental Studies on Model Screw Pile Anchors. *Proceedings of the Indian Geotechnical Conference*, pp. 465-468.
- Narasimha Rao, S., Prasad, Y.V.S.N. and Shetty, M.D., 1991. The Behavior of Model Screw Piles in Cohesive Soils. *Soil and Foundations*, Vol. 31, No. 2, pp. 35-50.
- Narasimha Rao, S. and Prasad, Y.V.S.N., 1993. Estimation of Uplift Capacity of Helical Anchors in Clays. *Journal of Geotechnical Engineering*, ASCE, Vol. 119, No. 2, pp. 352-357.
- Narasimha Rao, S., Prasad, Y.V.S.N. and Veeresh, C., 1993. Behavior of Embedded Model Screw Anchors in Soft Clays. *Geotechnique*, Vol. 43, No. 4, pp. 605-614.
- Narasimha Rao, S. and Prasad, Y.V.S.N., 1992. discussion of Uplift Behavior of Screw Anchors in Sand. I: Dry Sand. *Journal of Geotechnical Engineering*, ASCE, Vol. 118, No. 9, pp. 1474-1476.
- Pack, J.S., 2000. Design of Helical Piles for Heavily Loaded Structures. *New Technological and Design Developments in Deep Foundations*, ASCE, pp. 353-367.
- Perko, H.A., 2000. Energy Method for Predicting the Installation Torque of Helical Foundations and Anchors. *New Technological and Design Developments in Deep Foundations*, ASCE, pp. 342-352.

Prasad, Y.V.S.N. and Narasimha Rao, S., 1994. Pullout Behavior of Model Piles and Helical Pile Anchors Subjected to Lateral Cyclic Loading. *Canadian Geotechnical Journal*, Vol. 31, No. 1, pp. 110-119.

Prasad, Y.V.S.N. and Narasimha Rao, S., 1996. Lateral Capacity of Helical Piles in Clays. *Journal of Geotechnical Engineering*, ASCE, Vol. 122, No. 11, pp. 938-941.

Radhakrishna, H.S., 1975. Helix Anchor Tests in Stiff Fissured Clay. *Ontario Hydro Research Division Research Report*.

Radhakrishna, H.S., 1976. Helix Anchor Tests in Sand. *Ontario Hydro Research Division Research Report* 76-130-K, pp. 1-33.

Robinson, K.E. and Taylor, H., 1969. Selection and Performance of Anchors for Guyed Transmission Towers. *Canadian Geotechnical Journal*, Vol. 6, pp. 119-135.

Rodgers, T.E. Jr., 1987. High Capacity Multi-Helix Screw Anchors for Transmission Line Foundations. *Foundation for Transmission Line Towers*, ASCE, pp. 81-95.

Rupiper, S. and Edwards, W.G., 1989. Helical Bearing Plate Foundations for Underpinning. *Foundation Engineering: Current Principles and Practices*, ASCE, Vol. 1, pp. 221-230.

Rupiper, S., 1994. Helical Plate Bearing Members, A Practical Solution to Deep Foundations. *Proceedings of the International Conference on the Design and Construction of Deep Foundations*, Vol 2, pp. 980-991.

Seider, G., 1993. Eccentric Loading of Helical Piers for Underpinning. *Proceedings of the 3rd International Conference on Case Histories in Geotechnical Engineering*, Vol. 1, pp. 139-145.

Trofimenkov, J.G. and Maruipolshii, L.G., 1965. Screw Piles Used for Mast and Tower Foundations. *Proceedings of the 6th International Conference on Soil Mechanics and Foundation Engineering*, Vol. 2, pp. 328-332.

Udwari, J.J, Rodgers, T.D., and Singh, H., 1979. A Rational Approach to the Design of High Capacity Multi-Helix Screw Anchors. *Proceedings of the 7th Annual IEEE/PES, Transmission and Distribution Exposition*, pp. 606-610.

Vickars, R.A. and Clemence, S.P., 2000. Performance of Helical Piles with Grouted Shafts. *New Technological and Design Developments in Deep Foundations*, ASCE, pp. 327-341.

Weikart, A.M. and Clemence, S.P., 1987. Helix Anchor Foundations - Two Case Histories. *Foundations for Transmission Line Towers*, ASCE, pp. 72-80.

Yokel, F.Y., Chung, R.M., and Yancey, C.W.C., 1981. NBS Studies of Mobil Home Foundations. U.S. National Bureau of Standards Report NBSIR 81-2238.

Zaman, A. and Jayawickrama, P.W., 1997. Helical Screw Anchors in Foundation Underpinning: Advantages and Limitations. Proceedings of the Texas Section ASCE Spring Meeting.