

Professor Gray Mullins, Ph.D., P.E.

Dr. Mullins is a professor, researcher, and active engineering practitioner in the fields of foundation design, construction, quality assurance, integrity testing, capacity enhancement, remediation of corrosion damaged piles, instrumentation, load testing and remote monitoring. He has authored over 90 articles, 40 research reports and has 6 patents reflecting innovations in related areas. His work has resulted in numerous state and federal specifications to assure proper foundation construction.

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EDUCATION

- Ph.D., Civil Engineering, University of South Florida, Tampa. April 1996
Dissertation: Field Characterization of Dynamic Replacement and Mixing of Florida Organic Soils. Advisor: Prof. Manjriker Gunaratne
- M.S., Civil Engineering, University of South Florida, Tampa. August 1990
Thesis: Effects of Admixture in Soil Liners on Pollutant Migration
Advisor: Prof. Rajaram Janardhanam
- B.S., Civil Engineering, University of South Florida, Tampa. April 1988
- A.A., Manatee Junior College, Bradenton, Florida. May 1983

PROFESSIONAL EXPERIENCE

- 2009 - Present Professor
University of South Florida, Tampa
- 2002 - 2009 Associate Professor
University of South Florida, Tampa
- 1996 - 2002 Assistant Professor
University of South Florida, Tampa
- 1992 - 1996 Graduate Instructor and Research Associate, Department of Civil and Environmental Engineering, University of South Florida, Tampa
- 1990 - 1992 Adjunct Instructor, Department of Civil Engineering and Mechanics, University of South Florida, Tampa
- 1988 - 1990 Teaching Assistant, Department of Civil Engineering and Mechanics, University of South Florida, Tampa
- 1989 - 1990 Research Assistant, Department of Civil Engineering and Mechanics, University of South Florida, Tampa
- 1988 - 1989 Staff Engineer at Greiner Inc, Tampa

PROFESSIONAL REGISTRATION

- Registered Profession Engineer, State of Florida #52725 (1998 – Present)

PROFESSIONAL ORGANIZATIONS

- American Society of Civil Engineers, Member
- Deep Foundation Institute, Member
- American Concrete Institute, Member
- American Society of Testing Materials, D18-11 Committee
- Association of Drilled Shaft Contractors, Technical Affiliate Member
- Academy of Inventors

AWARDS

- Charles Pankow Award for Innovation, ASCE's OPAL Award Gala, Washington, DC, March, 2015, "Thermal Integrity Profiler."
- Ben C. Gerwick Award for Innovation in Design and Construction of Marine Foundations, Deep Foundations Institute, received in Tarrytown, NY August, 2014
- C. William Birmingham Award for Innovation "Thermal Integrity Profiler," Deep Foundations Institute, received in Phoenix, AZ, October, 2013.

- Construction Innovation Forum Nova Award Winner, Construction Users Round Table, received in Tucson, AZ, November, 2013.

PATENTS

- Mullins, A. G. and Sen, R. (2016) "Systems and Methods for Applying Reinforcement Materials to Existing Structures, US Patent Pub No. U.S. Patent No. 9,322,508.
- Mullins, A. G. and Johnson, K., (2012) "Voided Drilled Shafts" U.S. Patent No. 8,206,06
- Mullins, A. G. and Sen, R., (2010) "Bond Enhancement for Underwater Repairs" U.S. Patent No. 7,871,483
- Mullins, A. G., Winters, D., Stokes, M., and Lewis, C.L. (2010) "End Bearing Enhancement via Post Construction Preload / Reload" US Patent No. 7,651,302 B2.
- Mullins, A. G. and Kranc, S. C., (2004) "Method for testing the integrity of concrete shafts" US Patent No. 6,783,273.
- Mullins, A. G., (2002) "Lateral Motion Sensing Assembly" US Patent No. 6,386,043

PATENTS PENDING

- Mullins, A. G. and Mullins, M. P. (submitted 2016) "Automated Down-hole Slurry Testing Device," USF Record No. 16A056.
- Mullins, A. G., Sen, R. and Jones, L (submitted 2012) "Systems and Methods for Splicing Pile Segments" USF Record No. 12A069PR2C.
- Sagues, A., Fernandez, J., Hutchison, M., and Mullins, A. G., (submitted 2014) "Desiccant Anchor Cap for Pre-Grouting Tendon Corrosion Control" USF Record No. 13A096PR

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1. Mullins, G., Sen, R. and Johnson, K. (2016). "Post-Tensioned Pile Splice Part I: Concept Development," PCI Journal, accepted.
2. Pai, N., Gualtero, I., Alvi, A., Sen, R. and Mullins, G. (2016). "Prioritization Strategy for Replacing Deteriorating Deck Panel Bridges", ASCE Journal of Bridge Engineering, Published online 1/28/16; 10.1061/(ASCE)BE.1943-5592.0000886
3. Mullins, G. (2015). "Construction QA/QC Methods for Post Grouting Drilled Shafts." J. Perform. Constr. Facil. , 10.1061/(ASCE)CF.1943-5509.0000827 , 04015085.
4. Gualtero, I., Alvi, A., Pai, N, Sen, R., Mullins, G. (2015). "Deterioration Model for Precast Deck Panel Bridges". TRB 94th Compendium of Papers, Paper No 15-2832, 26 pages
5. Habegger, M.L, Dean M.N, Dunlop, J.W.C, Mullins, G, Stokes, M, Huber, D.R, Winters, D. and Motta, P.J, (2014). "Feeding in Billfishes: Inferring the Role of the Rostrum from a Biomechanical Standpoint," Journal of Evolutionary Biology (accepted).
6. Mullins, G., Spears, L. and Swanson, C. (2014). "Dynamic Replacement of Soft Soils for Roadways," ASCE Journal of Geotechnical and Geoenvironmental Engineering, (in review).
7. Mullins, G. (2013). "Advancements in Drilled Shaft Construction, Design and Quality Assurance: The Value of Research," International Journal of Pavement Research and Technology, vol. 6 No. 2, pp 93-99.
8. Fernandez, J., Sagues, A. and Mullins, G. (2013). "Investigation of Stress Corrosion Cracking Susceptibility of High Strength Stainless Steels for Use as Strand Material in Prestressed Concrete Construction in a Marine Environment," *NACE International, Corrosion 2013 Conference & Expo*, Paper No. 2686.
9. Alvi, A., Gualtero, I., Sen, R. and Mullins, G. (2012). "Repair of Construction-Related Deterioration in Precast Deck Panel Bridges". Transportation Research Record, 2292, Issue 1, pp. 104-112.
10. Winters, D. and Mullins, G. (2012). "Thermal Integrity Profiling of Concrete Deep Foundations," *Proceedings Geo-Construction Conference / ADSC Expo 2012*, San Antonio, TX, pp. 155-165.
11. Mullins, G., Likins, G. E., Beim, G (2012). Método de Perfilagem Térmica para Avaliação da Integridade de Fundações Moldadas In Loco. Cobramseg 2012; XVI Congresso Brasileiro de Mecânica dos Solos e Engenharia Geotécnica: Pernambuco, Brazil.
12. Mullins, G., Likins, G., Beim, G., and Beim, J. (2012), "AVALIAÇÃO DA INTEGRIDADE DE FUNDAÇÕES MOLDADAS IN LOCO PELO MÉTODO DE PERFILAGEM TÉRMICA," *Proceedings of the 7th Seminar on Special Foundations Engineering and Geotechnics*, Sao Paulo, Brazil, June 17-20, pp.
13. Sen, R., Mullins, G., Aguilar, J. and Winters, D. (2011) "Advances in Corrosion Repair of Piles Using FRP". ACI-SP for FRPRCS 10, April.
14. Mullins, G. (2010) "Thermal Integrity Profiling of Drilled Shafts," *DFI Journal*, Deep Foundations Institute, Vol. 4, No. 2, December, pp 54-64.
15. Aguilar, J., Winters, D., Sen, R., Mullins, G. and Stokes, M. (2010). "FRP-CP System for Pile Repair in Tidal Waters". *Transportation Research Record 2150*, pp. 111-118.

16. Suh, K.S., Mullins, G., Sen, R. and Winters, D. (2010). "Effective Repair for Corrosion Control Using FRP". ASCE, *Journal of Composites for Construction*, Vol. 14, No. 4, pp. 388-396.
17. Aguilar, J., Winters, D., Sen, R., Mullins, G. and Stokes, M. (2009). "Improvement in FRP-Concrete Bond by External Pressure". *Transportation Research Record*, No. 2131, pp. 145-154.
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23. Stevens, K., Jacobsen, L., Weinmann, T. and Mullins, G. (2009). "Improving Vibrating Wire Noise Immunity using Spectral Analysis," Conference Proceedings *Fatigue and Fracture in the Infrastructure - Bridges and Structures of the 21st Century*, July 26-29, Philadelphia.
24. Sen, R., Mullins, G. and Shahawy, M. (2008). "FRP Repair and Strengthening of Structurally Deficient Piles". *Journal of Transportation Research Board*, No 2028, Design of Structures, pp. 221-230. *Nominated for Outstanding Paper Award*.
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28. Mullins, G., Winters, D, and Dapp, S., (2008). "Closure to *Predicting End Bearing Capacity of Post Grouted Drilled Shafts in Cohesionless Soils*" ASCE *Journal of Geotechnical and GeoEnvironmental Engineering*, Vol. 134, No. 3, p. 413.
29. Sen, R. and Mullins, G. (2007). "Application of FRP for Underwater Pile Repair", *Composites Part B*, Vol. 38, No. 5-6, pp. 751-758.
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- Conference, Benefits of Composites in Civil Engineering, University of Stuttgart, March 28-30, Paper 19B, 10 pages.
39. Sen, R. and Mullins, G. (2007). "Developments in Underwater FRP Repair of Corroding Piles", Second International Conference on Recent Advances in Composite Materials, Bakht Symposium, New Delhi, India, Feb 20-23, 8 pages.
 40. Mullins, G. (2006). "In Situ Soil Testing," *Chapter 2, The Foundation Engineering Handbook*, Gunaratne, M. (ed), CRC Press, Taylor & Francis Group, Boca Raton, FL, ISBN 0-8493-1169-4, pp.47-86.
 41. Mullins, G. (2006). "Design of Drilled Shafts," *Chapter 7, The Foundation Engineering Handbook*, Gunaratne, M. (ed), CRC Press, Taylor & Francis Group, Boca Raton, FL, ISBN 0-8493-1169-4, pp.299-326.
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 50. Mullins, G., Sen, R., Sosa, R. and Issa, M. (2003). "Full-Scale Testing of Seal Slab / Pile Interface Bond". *SP-211 ACI Large Scale Structural Testing* (Ed. M. Issa and Y.L. Mo). Farmington Hills, MI, pp 315-341
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 56. Sen, R., Mullins, G., and Salem, T., (2002). "Durability of E-Glass/Vinylester Reinforcement in Alkaline Solution," *ACI Structural Journal*, Vol 99, No. 3, pp. 369-375.
 57. Mullins, G., Sosa, R., and Sen, R., (2001). "Seal Slab Prestressed Pile Interface Bond from Full-scale Testing," *ACI Structural Journal*, Vol 98, No. 5, pp. 743-751.
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BOOK CHAPTERS

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Other Publications

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5. Massaccesi, M. and Mullins, G. (2011), “Il metodo di controllo thermal integrity profiler,” *PF-Rivista Italiana delle Perforazioni & Fondazioni*, ed. SCI Editrice srl, November/December, pp 62-67.
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2. Mullins, G. and Mullins, M. (2016). "Field Device To Measure Viscosity, Density, and Other Slurry Properties in Drilled Shafts, FDOT Project No. BDV25-977-08, Final Report, 265 pp.
3. Mullins, G., Gunaratne, M., Costello, K. and Baker, S. (2015). Soil Mixing Design Methods and Construction Techniques for use in High Organic Soils, FDOT Project No. BDK84-977-25 / BDV25-977-14, Final Report, 374 pp.
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5. Mullins, G. and Winters, D. (2014) Defining the Upper Viscosity Limit for Mineral Slurries used in Drilled Shaft Construction, FDOT Project No. BDK84-977-24, Final Report, 264 pp.
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35. Bradford, N., Sen, R., Mullins, G., Cooke, S. and Crespi, R. (2000). "Rapid Deployment Emergency Shelter", Final Report submitted to Center for Disaster Management and Humanitarian Assistance/Office of Naval Research, December, 169 pp.
36. Sen, R., Mullins, G. and Snyder, D. (1999). "Ultimate Capacity of Corrosion Damaged Piles". Final Report submitted to Florida Department of Transportation, March, 178 pp.
37. Mullins, G., Sosa, R. and Sen, R. (1999). "Seal Slab/Pile Interface Bond". *Final Report* submitted to Florida Department of Transportation, November, 151 pp.
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RESEARCH PROJECTS (42 Grants)

Thermal Integrity Profiling for Augered Cast-In-Place Piles (Implementation Plan), (6mo), FDOT, 2016
Evaluation Of Self Consolidating Concrete And Class Iv Concrete Flow In Drilled Shafts - Part 1(3yr), FDOT, 2016
Evaluating Effect of Temporary Casing on Drilled Shaft Rock Socket Friction (2yr), FDOT, 2014
Effects of Polymer Slurry Exposure on Side Shear Performance (2yr), FDOT, 2014
Optimizing the Use of the Thermal Integrity System for Evaluating Auger-Cast Piles," (2yr), FDOT, 2014
Development of Down-hole Slurry Testing Device (2yr), FDOT, 2013
Design Methods for Organic Soil Mixing, (2yr), FDOT, 2013
Post Tensioned Splice for Precast/Prestressed Concrete Piles, (2yr), FDOT, 2012
Upper Viscosity Limit for Mineral Slurry used in Drilled Shaft Construction, (2yr), FDOT, 2011
Stainless Steel Reinforcing of Foundations, (2yr), FDOT, 2010
Thermal Integrity Testing of Drilled Shafts, (2yr), WSDOT, 2009
Effect of Polymer Additives on Mineral Slurry Performance, (1 yr), FDOT, 2009
Geothermal Well Evaluation (1 yr), Coastal Synergy Corp, 2009
Remote Monitoring of Bridges (2 yr), FDOT, 2009
Rapid Hydration of Mineral Slurries for Drilled Shafts (1 yr), FDOT, 2008
Assessment of Friendship Trails Bridge (6 mos), Hillsborough County, 2008
Underwater FRP Repair of Corroding Piles w/ CP (2 yr), TRB, 2008
Innovative Underwater FRP Pile Repair, Hillsborough County (1yr), 2008
Foundation Health Monitoring (2 yr), FHWA, 2007
Rapid Load Testing System Evaluation (1yr), FGE, 2007
Mitigating Mass Concrete Effects in Drilled Shafts (2 yr), FDOT, 2007
Effects of Cantilevered Wall Movements on Adjacent Roadways (1 yr), FDOT, 2007
Instrumentation and Monitoring of Drilling/Boring-type Subsurface Investigation (1yr), DESI, 2006
Wireless PDA Algorithm Evaluation (1yr), Smart Structures Inc., 2006
Environmental Enclosure for Aircraft Carrier Decks (1 yr), U. S. Navy, 2005
Thermal Integrity Testing of Drilled Shafts (2yrs), FDOT, 2004

Impact of Hurricane Charley on Residential and Commercial Construction (1 yr), NSF, 2004
NDT Evaluation and Replacement Prioritization of Composite Precast Deck Panel Bridge Decks (2yrs) FDOT, 2002
CFRP Repair and Strengthening of Structurally Deficient Piles (2yrs) FDOT, 2002
The Influence of Water Table in Drilled Shaft Construction (3 yrs) FDOT, 2001
The Effect of Pressure-Grouting Drilled Shaft Tips on Bearing Capacity, Phase II (2 yrs) FDOT, 2001
Rapid Deployment Shelter, (2yrs), CDMHA, 2000
The Effect of Pressure-Grouting Drilled Shaft Tips on Bearing Capacity, Phase I (2 yrs) FDOT, 1999
Lateral Capacity of Corrosion Damaged Piers (2 yrs) FDOT, 1999
Design of Drilled Shafts in Rock for Lateral Loading (1yr) Auburn University Subcontract, 1999
Geographic Information System for FDOT Districts One and Seven Geotechnical Data (2 yr) FDOT, 1999
Recommendations and Guidelines for Statnamic Testing in Cohesionless Soils (2 yr) FHWA, 1998
Long Span Bridge Alternative Designs (1 yr) FDOT
Bond of Cast in Place Concrete (2 yrs) FDOT, 1998
Strength of Repaired Piles (2 yrs) FDOT, 1998
Soil Stress Distribution beneath Shallow Foundations (1 yr) DSR, 1997
Strength of Damaged Piles (2 yrs) FDOT. 1997