Andrew Littlefield

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Education

Rensselaer Polytechnic Institute, Troy, NY — May 2000

Ph.D. Mechanical Engineering, QPA 3.88 / 4.00

Thesis Title: Application of the Impedance Method of Modeling Active Materials to Plate Structures

Rensselaer Polytechnic Institute, Troy, NY — August 1994

M.E. Mechanical Engineering, QPA 3.80 / 4.00

Project Title: Shape Control and Damage Mitigation of Composite I-Beams Using Shape Memory Alloy Actuators

Rensselaer Polytechnic Institute, Troy, NY — May 1992

B.S. Mechanical Engineering, QPA 3.828 / 4.00

Magna Cum Laude

Professional Experience

2000 - Present — US Army Benét Laboratories — Watervliet, NY

Mechanical Engineer

Performed advanced engineering work, in the areas of vibration suppression and advanced composite structures, to support research and development efforts on large caliber gun systems. In charge of the Advanced Composites Launcher Laboratory and considered to be Benet's resident expert on advanced composite materials. This involves contributing, to some degree, to all programs using advanced composites at Benet.

Responsible for simulated proof testing of mortar baseplates. This involved determining the test methodologies and hardware for applying the simulated firing load and validating the test output. Currently baseplates for all mortar systems are undergoing simulated proof testing instead of live fire proofing. In the first two years alone this effort saved over two-million dollars.

Leader of the Composites Thrust of the Durable Gun Barrels MTO. This thrust was responsible for developing a robust, cost effective, production capable system for manufacturing composite gun barrels with high-tension overwraps. Duties included helping to get the MTO funded by briefing at various levels, determining which materials would be used, procuring the necessary equipment, manufacturing and evaluating stub tubes of various configurations, and firing a full scale gun tube with a high tension overwrap. The technology being developed by the MTO was used on the SDD program of FCS-MCS. This work led to receiving the 2008 US Army Research and Development Achievement Award.

Responsible for manufacturing the composite containment structure for the the electromagnetic railgun launcher program. This included overseeing the manufacture of stub tubes and full size launchers in-house as well as component material selection and inputs to the cross-sectional design of the launcher. This program is utilized the wind in tension process

developed by the Durable Gun Barrels MTO. Two meter and four meter railguns were manufactured and successfully test fired.

Responsible for the composite tube support for FCS MRAAS. Besides standard design and fabrication work this also included selection of manufacturing process and selection / procurement of the necessary materials. The tube support was successfully fired in Summer 2003 and was the first major composite component manufactured at Benet in over five years. This work led to receiving the 2004 US Army Research and Development Achievement Award.

Responsible for the non-destructive evaluation (NDE) of all composite structures at Benet. This includes performing/overseeing acoustic emission, modal impact and ultrasonic inspection testing of structures ranging from composite tube supports to stub and full size composite overwrapped gun tubes.

Served as acting Unit Supervisor for the Modeling and Simulation Unit of the Technology Division from Oct 2003 to Jan 2004. The Modeling Unit is a 20-person team that also includes two fatigue labs and a firing range. Some of the activities during this time frame included employee evaluations, workload adjustments and acquiring of new personnel.

1995 - 2000 Rensselaer Polytechnic Institute Troy, NY

Researcher

Experimentally validated a method to predict the response of plate structures to excitation by piezoelectric actuators. Extended the existing method to include composite materials and various boundary conditions. Designed and maintained the lab's web site.

1992 - 1999 USAF Palace Knight Program

Mechanical Engineer

Part of the USAF Palace Knight Program to increase the number of Ph.D.s in the Air Force's research labs. Involved time at both Rensselaer and USAF Research Lab (AFRL/VSDV).

May 1999 Rensselaer Polytechnic Institute Troy, NY

Consulting Engineer

Consulted with the Sailplane Project to experimentally determine the natural frequencies of the T-tail of the RP-3 sailplane.

1997 - 1999 UTECH Products, Inc Albany, NY

Computer Consultant

Provided consulting services as needed in the research and development department of a medical software and products company.

Maintained the existing NT and Novell networks. Interfaced the NT domains and the Novell network. Designed and maintained the company web sites. Wrote install routines and help files for the company's software. Performed Year 2000 compliance testing of the software. Assembled specialized PC's for customers and installed and configured them on site with UTECH's software. Interfaced the PC's with endoscopy systems in procedure rooms. Ran the company's booth at the 1998 SGNA Trade Show. Handled tech support calls from customers.

Appointed acting Director of R&D, after the previous Director of R&D left in

February 1999.

1996 - 1998 Smart Sites, Inc. Rutland, VT

Web Site Developer

Designed and maintained web sites for customers. Trained customers in maintaining their own web sites. Backup Administrator for the company's server.

1996 Troy, NY

Test Engineer

Contributed in the fabrication and testing of a composite speed skiing helmet for a member of the US Speed Skiing Team.

1994 - 1995 USAF Phillips Lab Edwards AFB, CA

Mechanical Engineer

Worked at the Applied Composites Branch of the Space & Missiles Technology Directorate of Phillips Lab (OL-AC PL/VTSC).

Project Officer for the branch's participation in the MSTI-2 and 3 projects. Managed resources to produce an all-composite antennae mast.

Point of contact for the Low Cost Composite Space Structure project. Performed design and analysis for both the breadboard and flight boom. Oversaw fabrication of the breadboard boom.

Developed a way of fabricating isogrid cylinders. Received a team award for this activity.

Developed, instituted, and maintained an inventory database program for the composites lab.

Recognized as the branch's computer hardware, software, and CAD expert. Set up and maintained a Windows for Workgroups network over the existing Novell network.

1992 - 1994 Rensselaer Polytechnic Institute Troy, NY

Researcher

Conducted research to support Master's project. Designed and fabricated composite I-beams with embedded shape memory alloy actuators.

1990 - 1992 Rensselaer Sailplane Project (RP-3) Troy, NY

Fuselage Group Leader

Responsible for fabrication and installation of composite structures for the fuselage. Performed the conceptual design for the landing gear. Various types of composite materials including graphite, Kevlar®, and fiberglass were used to fabricate the parts. Fabrication methods included room temperature curing wet lay-ups and prepreg lay-ups in an autoclave.

1991 Rensselaer Polytechnic Institute Troy, NY

Design Engineer

Developed a vacuum forming process for the creation of prototype composite parts and final molds, from a CAD model. Process reduces the time required for making a master mold from several weeks or months to a day or two.

Computer Experience

AutoCAD, Pro/Engineer, SolidWorks, FEMAP, MSC/NASTRAN, ABAQUS, ABAQUS/CAE, Cosmos/M, Maple V, Matlab, Lab View, Siglab, Mathcad, Delphi, Interbase 5.0 Client/Server, MS FrontPage, MS Office, MS Word, MS Excel, MS PowerPoint, MS Project, MS Access, MS Publisher, MS Visio, MS Internet Information Server, UNIX, Windows

Professional Societies

American Society of Mechanical Engineers

Society for the Advancement of Materials and Process Engineering

Tau Beta Pi National Engineering Honor Society

Pi Tau Sigma National Honorary Mechanical Engineering Fraternity

Awards

2008 US Army Research & Development Achievement Award

2004 US Army Research & Development Achievement Award

Shock and Vibration Information Analysis Center (SAVIAC) Director's Award - 2003 & 2004

SAMPE Best Paper Award

Benet Laboratories Team Award

Rensselaer Scholarship

Arthur E. Coia Scholarship (Laborer's International Union)

Dean's list all semesters at Rensselaer Polytechnic Institute

Leon J. Salinger Award (H.S. Valedictorian)

Patents

Littlefield, A. and Root, J. "Electromagnetic Gun Launcher," U.S. Patent Number 7,752,954 B1 (2010)

Johnson, M., and Littlefield, A., "Self Powering Prognostic Gun Tag," U.S. Patent Number 7,716,863 B1 (2010)

Publications

Littlefield, A., Hyland, E, and Keating, J., "120MM Prestressed Carbon Fiber / Thermoplastic Overwrapped Gun Tubes," Proceedings of 27th Army Science Conference, 29 Nov - 2 Dec 2010, Orlando, FL.

Littlefield, A., and Sibilia, J., "Simulated Proof Testing of Mortar Baseplates," Proceedings of SAVIAC's 81st Shock and Vibration Symposium, 24 – 28 Oct 2010, Orlando, Fl.

M. Macri, A. Littlefield "Multiscale Modeling Of Composite Materials Using Structural Based Enrichment at High Temperatures", 9th World Congress on Computational Mechanics and 4th Asian Pacific Congress on Computational Mechanics, 19 – 23 Jul 2010, Sydney, Australia.

M. Macri, A. Littlefield "Multiscale Modeling of High-Temperature Performance of Heterogeneous Materials using Structural Based Enrichment", IV European Conference on Computational Mechanics, 16 – 21 May 2010, Paris, France.

Root, J., and Littlefield, A., "An Analysis of EM Railgun Cross Section Designs," Benét Labs Technical Report, Jan 2010.

Littlefield, A. and Hyland, E., "Development and Testing of Prestressed Carbon Fiber Overwrapped Gun Tubes," Proceedings of the 17th International Conference on Composite Materials, 27 – 31 Jul 2009, Edinburgh, Scotland

Littlefield, A, and Sibilia, J," Simulated Proof Testing of Mortar Baseplates, " Proceedings of 26th Army Science Conference, 1 – 4 Dec 2008, Orlando,

FL.

Littlefield, A., Hyland, E, and Keating, J. “Prestressed Carbon Fiber Composite Overwrapped Gun Tube,” Proceedings of 26th Army Science Conference, 1 – 4 Dec 2008, Orlando, FL.

Littlefield, A, Root, J., and Mysliwiec, R., “Wind in Tension and the Cantilevered Firing of an EM Railgun,” Proceedings of the DoD Innovative Science and Technology EM Railgun Workshop, Albuquerque, NM 23 – 25 Sep 2008

Littlefield, A., Root, J., Mysliwiec, R, and Olsen, K, ”Prestressed Carbon / Fiber Thermoplastic Electromagnetic Railgun (ITAR)" Proceedings of the SAMPE Technical Conference, 8 – 11 Sep 2008, Memphis, TN

Root, J. and Littlefield, A. “Analysis of Excalibur / M284 Muzzle Brake Interference Issues” Benét Labs Technical Report, Sep 2008..

Littlefield, A., Hyland, E., Keating, J., “120mm Prestressed Thermoplastic Composite Overwrapped Gun Tube,” Proceedings of SAMPE 2007 Symposium & Exhibition (52nd ISSE), 3 – 7 Jun 2007, Baltimore, MD

Root, J., and Littlefield, A., "Minimizing Rail Deflections in an EM Railgun," Proceedings of 25th Army Science Conference, 27 – 30 Nov 2006, Orlando, FL.

Littlefield, A., Hyland, E., “Prestressed Carbon fiber Composite Overwrapped Gun Tube,” Proceedings of 25th Army Science Conference, 27 – 30 Nov 2006, Orlando, FL.

Root, J., and Littlefield, A., "Minimizing Rail Deflections in an EM Railgun," Proceedings of 13th EML Symposium, 22 - 25 May 2006, Potsdam, Germany.

Littlefield, A. “Carbon Fiber /Thermoplastic Overwrapped Gun Tubes,” Proceedings of Defense Manufacturing Conference (DMC) 2005, 28 Nov – 1 Dec 2005, Orlando, FL.

Littlefield, A., Hyland, E., Klein, N., Andalora, A., Langone, R., Becker, R., “Prestressed Carbon Fiber / Thermoplastic Overwrapped Gun Tube,” Limited Distribution Proceedings of the 37th International SAMPE Technical Conference, 30 Oct – 3 Nov 2005, Seattle, WA

Littlefield, A., Hyland, E., Klein, N., Andalora, A., Langone, R., Becker, R., “Carbon Fiber / Thermoplastic Overwrapped Gun Tube,” Proceedings of the 2005 Advanced Gun Barrel Manufacturing Symposium, 12 – 14 Jul 2005, St. Michaels, MD.

Littlefield, A., Hyland, E., Klein, N., Andalora, A., Langone, R., Becker, R., “Design, Fabrication and Testing of a Thermoplastic Composite Overwrapped Gun Tube,” Limited Distribution Proceedings of SAMPE 2005 Symposium & Exhibition (50th ISSE), Long Beach, CA 1 – 5 May 2005.

Tierney, J., Anderson, S., Yarlagadda, S., Gillespie, J., Hyland, H., Crayon, D., Littlefield, A., Tzeng, J., Burton, L., "Optimal Design of Cylindrical Steel/Composite Hybrid Structures for Gun Barrel Applications," Proceedings of SAMPE 2005 Symposium & Exhibition (50th ISSE), Long Beach, CA 1 – 5 May 2005.

Littlefield, A., Hyland, E., Klein, N., Andalora, A., Langone, R., Becker, R., “Carbon Fiber / Thermoplastic Overwrapped Gun Tube,” Proceedings of Gun Tubes 2005, Oxford, England, 10 – 13 Apr 2005.

Littlefield, A., Hyland, E., Klein, N., Andalora, A., Langone, R., Becker, R., “Carbon Fiber / Thermoplastic Overwrapped Gun Tube,” Proceeding of 1st Annual Tech Valley Engineering Symposium, Schenectady, NY, 5

Apr 05.

Littlefield, A., Root, B., “Composite Gun Tube Support,” Proceedings of the 24th Army Science Conference, Orlando, FL, 29 Nov – 2 Dec 2004. Summary Paper DS-10.

Littlefield, A., Root, B., Leach, M., “Composite Gun Tube Support,” Proceedings of the 36th International SAMPE Technical Conference, San Diego, CA 15 – 18 Nov 2004. - Second Place Best Paper Award

Smith, D., O’Hara, G., Cler, D., Littlefield, A., Leach, M., “Weight Reduction Analysis of a 90mm Water Cannon,” Benét Labs Technical Report, ARAEW-TR-04004, Apr 2004.

Littlefield, A., “Firing Test of a Composite Gun Tube Support for the Multi-Role Armament and Ammunition System," SAVIAC's 74th Shock and Vibration Symposium, San Diego, CA 27-31 Oct 2003.

Littlefield, A., Hyland, E., “Use of Composites on the FCS-MRAAS Swing Chamber Launcher for Reduced System Weight,” 23rd Army Science Conference, Orlando, FL, 2 – 5 Dec 2002. Poster / Paper CP-08.

Littlefield, A., Kathe, E., “Gun Barrel Vibration Absorbers For Medium And Large Caliber Systems,” 23rd Army Science Conference, Orlando, FL, 2 – 5 Dec 2002. Abstract CA-03.

Littlefield, A, Kathe, E., Durocher, R., “Dynamically Tuned Shroud for Attenuating Gun Barrel Vibrations,” Benét Labs Technical Report, ARCCB-TR-02010, Aug 2002.

Littlefield, A., Fairweather, J., Craig, K., "Use of FEA Derived Impedances to Design Active Structures," Journal of Intelligent Material Systems and Structures, Vol. 13, Jun 2002, pp 377 - 389.

Littlefield, A, Kathe, E., Durocher, R., “Dynamically Tuned Shroud for Gun Barrel Vibration Attenuation,” Proceedings of SPIE Volume 4697, Smart Structures and Materials 2002: Damping and Isolation, Jun 2002. Paper 4697-10.

Littlefield, A., Kathe, E., “Adaptive Gun Barrel Vibration Absorber,” Benét Labs Technical Report, ARCCB-TR-02003, Mar 2002.

Littlefield, A., Kathe, E., Messier, R., Olsen, K., “Gun Barrel Vibration Absorber to Increase Accuracy,” Benét Labs Technical Report, ARCBB-TR-02002, Feb 2002.

Littlefield, A., Kathe, E., Messier, R., Olsen, K., “Gun Barrel Vibration Absorber to Increase Accuracy,” Proceedings of the 42nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Seattle, WA 16 – 19 Apr 2001.

Littlefield, A., Kathe, E., “Adaptive Gun Barrel Vibration Absorber,” 10th U.S. Army Gun Dynamics Symposium, Austin, TX, 23 – 26 Apr 2001.

Littlefield, A., Fairweather, J., Craig, K., "FEA based impedance method for designing active structures," SPIE's 7th International Symposium on Smart Materials and Structures, Newport Beach, CA, 5 – 9 Mar 2000.

Leadership / Activities

Rensselaer Fencing Club - Competitive Member

Rensselaer Motorcycle Club – Founding member and past secretary

Rensselaer Ski Team – Former member and B-team Captain.

Tau Beta Pi – Former Initiation Director for the Rensselaer Chapter.

Pi Tau Sigma – Former Special Activities Coordinator for the Rensselaer Chapter

SAMPE - Member and former RPI student chapter president

United States Fencing Association –Former chairman of the Hudson Berkshire Division, D ranked épée fencer