

PROFESSIONAL RESUME OF RICHARD B. LOUCKS, PH.D., P.E., C.M.I.

I. General Information

Compendium:

Senior Technical Consultant, Principal Engineer

Mechanical Engineering, forensic engineering experience includes investigations of: product design and defect; industrial accidents involving forge machines, sheet steel presses, packaging machines, lathes, each involving thermal systems, guards, lock-out/tag-out; commercial and residential pressure pipe failures; furnace and boiler explosions; natural gas, propane, butane appliance and distribution systems fires and explosions; land vehicle and marine craft accident reconstruction; failure analysis of steel, plastics, glass, aluminum, titanium, and other metal alloys; mechanical components failure analysis of gears, cams, shafts, bolts and other fasteners, couplings, pipe and fittings, valves, tanks, pressure vessels, heat exchangers, springs, blowers, pumps, turbines, compressors; hydraulic systems, pumps, hoses, controls, and safety systems; pneumatic systems, actuators, compressors, oil distribution systems; construction equipment and components; vertical reciprocating conveyors, material hoists, conveyors, and other material handling equipment; boom lifts, scissors lifts, and other personnel lifts; refrigeration systems, cooling towers, energy recapture systems, hydronic systems, Heating, Ventilation, and Air Conditioning (HVAC) systems, air filtration, humidification and desiccation; building sanitary systems, grease traps, and maintenance; water source identification from mold and mildew issues; gasoline and diesel fuel distribution systems, pumps, tanks, pipes; patent and copyright infringement.

Dr. Loucks has provided expert witness testimony in a court of law.

II. Professional Summary

Education:

Doctor of Philosophy

Mechanical Engineering
University of Maryland
College Park, Maryland
May 1998

Master of Mechanical Engineering

Mechanical Engineering
The Johns Hopkins University
Baltimore, Maryland
May 1990

Bachelor of Science

Mechanical Engineering
Virginia Polytechnic Institute and State University
Blacksburg, Virginia
June 1986

Continuing Education:

- (1) "Explosive Hazards Evaluation," Southwest Research Institute, San Antonio, Texas - November, 1988
- (2) "The National Course on Fuzing and Initiation," Denis A. Silva Seminar, Corpus Christi, Texas - March, 1989
- (3) "DADS Training Course," Computer Aided Design Software, Inc., Aberdeen Proving Ground, Maryland - February, 1990
- (4) "Introduction to PATRAN plus PATRAN 101N," PDA Institute of Technology, Costa Mesa, California - September, 1990
- (5) "MSC NASTRAN/DYNA Training," McNeal-Schwendler Corp., Aberdeen Proving Ground, Maryland - November, 1990
- (6) "Shock and Vibration Measurement Technology," Endevco Corporation, Santa Fe, New Mexico - April, 1991
- (7) U.S. Army Artillery School for Scientist and Engineers, Fort Sill, Oklahoma - September 1991
- (8) U.S. Army Armor Orientation Course, Fort Knox, Kentucky - November 1991
- (9) U.S. Army Aviation Center's Aviation Orientation Course, Fort Rucker, Alabama - March 1992
- (10) USABRL AMC- Field Assistance in Science and Technology Training Program, Aberdeen Proving Ground, Maryland - July 1992
- (11) Introduction to Special Operations (SOC), Hurlburt Airfield, Florida - April 1992
- (12) Ammunition Explosive Certification Course, AMTEC Corporation, Aberdeen, Maryland - August 1993
- (13) "Interior Ballistics", Drexel University, Aberdeen Proving Ground, Maryland - December 1993
- (14) "Programming in C." Information Technology Development Corp., Aberdeen Proving Ground, Maryland - March 1994
- (15) "Systems Engineering Management Course." Department of Defense, Defense Systems Management College, Edgewood Arsenal, Aberdeen Proving Ground, Maryland - March 1994
- (16) "Treatment of Turbulence Models in Complex High Performance Computational Fluid Dynamics Applications." CFD CTA under the PET at the ARL and ASC MSRCs - March 1998
- (17) "Basic Marine Identification and Accident Reconstruction." International Association of Marine Investigators, Biloxi, Mississippi - June 2004
- (18) "Legal Issues for Virginia Professional Engineers." Half Moon Seminars, Richmond, Virginia - February 2006

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(19) "Annual Training Seminar." International Association of Marine Investigators, Virginia Beach, Virginia – March 2006

Experience:

President, Loucks Group LLC

Leesburg, VA
March 2003 to present

Mechanical Engineer and Principal of the Loucks Group LLC. Forensic engineering firm specializing in the investigation and reconstruction of accidents involving a loss claim or litigation. Area of specialization involves mechanical systems, devices, components, processes, and structures mechanisms, equipment, vehicles and personnel, resulting from highly dynamic complex forcing, impact and thermal loading on such as from explosions, blast, ballistic fragmentation impact, ground shock and vibration, collisions, drops, overload and multi-body impact.

Additional projects involves the conduct of research and development of emerging technologies involving fluids and mechanical systems, energy conservation, transfer and storage. Provide consulting to enhance industrial process efficiency, product improvement, enhance workplace safety, and evaluate products for compliance with codes and standards. Development of new structural blast effects mitigating technologies, optical filtration techniques for military and intelligence gathering applications, and alternate energy efficient engine concepts.

Senior Project Engineer, Mechanical/Director, Mechanical & Materials Group

FTI/SEA Consulting
Millersville, MD
October 1998 to March 2003

Mechanical Engineer and Group Leader of over forty highly skilled consulting engineers located throughout North America. Provided administrative management on projects with a staff of five, established budgets, schedules, allocation of resources and directed marketing and sales. Personal experience resulted from investigation and reconstruction of accidents involving highly dynamic complex forcing; impact and thermal loading from explosions effects; ballistic fragmentation impact; and ground shock and vibration on structures, mechanisms, equipment, vehicles and personnel. Additional work in product defects, industrial accidents, commercial and residential pipe failures, furnace failures, boiler explosions, natural gas and propane fires and explosions, vehicle accident reconstruction, marine accident reconstruction, failure analysis of materials, mechanical component design and manufacture defects. Provided engineering opinions, expert witness deposition and trial testimony.

Chief Investigator

U.S. Army Research Laboratory
Aberdeen Proving Ground, Maryland
October 1988 – October 1998

Senior investigator performing nuclear and conventional blast damage analysis; air blast, ground shock and vibration testing and research for Department of Defense and NATO clients against electronics equipment, vehicles, shelters, structures, ordnance, and personnel. Expertise in US and foreign infantry, armor, artillery, aviation and naval weapon systems, regarding effectiveness, vulnerabilities, defenses, logistics, and methods of deployment. Investigator modeling Chemical and Biological Weapons interaction within a micro-meteorological space.

Technical Consultant

Walcoff and Associates, Inc.
Arlington, Virginia
November 1994 – October 1995

Technical advisor to environmental remediation systems for the Department of Defense, Department of the Interior, and Government Accounting Office. Investigated several novel methods of remediation of sites contaminated with toxic, hazardous materials as well as Superfund sites. Process involved technical review of the proposed technology, discussion with developers, and evaluation of effectiveness and maturity of the technology.

Mechanical Systems Engineer

Dynamic Science, Inc.
Aberdeen Proving Ground, Maryland
October 1987 – October 1988

Investigator performing nuclear blast and thermal radiation damage analysis for Department of Defense and NATO clients against electronics equipment, vehicles, shelters, structures, ordnance, and personnel. Developed a synergistic nuclear blast and thermal effects simulator for test and evaluation of equipment intended to survive a limited tactical nuclear environment.

Project Engineer

Allied Contractors, Inc.
Baltimore, Maryland
July 1986 – October 1987

On-Site Heavy Construction Project Manager responsible for project oversight; standards compliance and quality control; management of materials, supplies, personnel and equipment; job site safety and OSHA compliance; tracking Work-In-Place and project progress using Critical Path Management system.

Civil Engineering Corps Officer (SCW)

U.S. Navy Reserve
January 1991 – Present

Naval Officer (Lieutenant Commander). Staff officer assigned to Naval Mobile Construction Battalions. Wartime construction project management, construction equipment management, Marine Squad infantry tactics and weapons proficiency.

III. Professional Registration and Certification

National Council of Examiners for Engineering and Surveying, Verification Certificate No. 23844
Registered Professional Engineer, Mechanical Engineer:

Maryland Registration No. 21456, Expires January 5, 2009
North Carolina, Registration No. 030804, Expires December 31, 2007
Pennsylvania, Registration No. PE072234, Expires September 30, 2007
Virginia Registration No. 0402 039255, Expires October 31, 2007
West Virginia Registration 16649, Expires June 30, 2007

Certified Marine Investigator (CMI), International Association of Marine Investigators, 2006
Ammunition/Explosives Group II Certification, Army Material Command R 359-4, RK0374, 1993

IV. Professional Societies

American Boat and Yacht Council (ABYC) Registration No. 15538
American Society of Mechanical Engineers (ASME) Registration No. 734194
American Society of Materials (ASM) Registration No. 502659
American Society for Testing and Materials (ASTM) Registration No. 000393424
E54.05 Standards Committee: Homeland Security Applications: Building & Infrastructure Protection
American Society of Safety Engineers (ASSE): Pending
A10 Standards Committee: Construction and Demolition Operations
Association of Independent Consultants (AIC)
International Association of Marine Investigators (IAMI) Registration No. 2521
International Association of Arson Investigators (IAAI) Registration No. 26213
National Fire Protection Association (NFPA) Registration No. 2331057
National Society of Professional Engineers (NSPE) Registration No. 104025998

V. Publications

Government Publications

- (1) R. Loucks, P. Muller, and R. Thane, "Rebuilding and Modeling of a Thermal Radiation Source." ARL-TR-501, August 1994.
- (2) R. Loucks, "Thermal Radiation Transmission through Composite Material." ARL-TR-784, June 1995.
- (3) R. Loucks, B. Davis, L. Moss, T. Pham, and M. Fong, "A Method of Identifying Supersonic Projectiles Using Acoustic Signatures." ARL-TR-859, September 1995.
- (4) R. Loucks, "Chebyshev Polynomial Fit for Terrain Elevation." ARL-TN-86, December 1996.
- (5) R. Loucks, "Use of a Correlation Coefficient for Conditional Averaging." ARL-TN-91, April 1997.
- (6) R. Loucks, "An Experimental Examination of the Streamwise Velocity in a Plane Mixing Layer Using a Single Hot-Wire Anemometer." ARL-TR-1391, September 1997.

Open Literature

- (1) G. Bulmash, R. Loucks, P. Muller, and R. Pearson, "Dynamics of the Nine Linear Accelerometer System for Measuring Blast Induced Target Displacements." Proceedings of the 1989 American Society of Mechanical Engineers International Computers in Engineering Conference, July 30 - August 3, 1989, Anaheim, California.
- (2) R. Loucks, "Dynamic Response Formulation for Pneumatically Driven Liquid in a Pressure Vessel." Proceedings of the 1991 American Society of Mechanical Engineers International Computers in Engineering Conference, August 19 - 20, 1991.
- (3) R. Loucks, "Evaluation of Thermal Radiation Simulator Rectangular Pulse Characterization Methods." Proceedings of the 1991 American Society of Mechanical Engineers International Computers in Engineering Conference, August 19 - 20, 1991.
- (4) R. Loucks, "Optimization and Modification of a Thin Flame Thermal Radiation Source." Proceedings of the Twelfth International Symposium on the Military Applications of Blast Simulation, Perpignon, France, September 1991.
- (5) R. Loucks, "The Effects of Transducer Response Rate on Thermal Radiation Data." Proceedings of the 1993 American Society of Mechanical Engineers International Computers in Engineering Conference, August 8 - 12, 1993.

- (6) R. Raley, K. Opalka, P. Muller, and R. Loucks, "*Simulation of Hurricane Wind Gusts with Shock Tube Exit Jets.*" Simulation for Emergency Management, Proceedings from the Simulation Multi-Conference, The Society for Computer Simulation, California, April 1994.
- (7) R. Loucks, P. Muller, R. Thane, T. Cline, L. Ferguson, and C. Mermagen, "*Simulation of Non-Ideal Blast with a Shock Tube Exit Jet.*" Proceedings of the Fourteenth International Symposium on Military Applications of Blast Simulation, New Mexico, September 1996.
- (8) R. Loucks, J. Wallace, and L. Ong, "*An Experiment Study of the Velocity and Vorticity Fields of a Plane Mixing Layer.*" Bulletin of the American Physical Society, v. 41, No. 9, November 1996.
- (9) J. Condon, R. Lottero, and R. Loucks, "*Construction and Testing of the ARL 1.68 m Diameter Shock Tube Exit Jet Spreader for Non-Ideal Blast Simulation.*" Proceedings of the Fifteenth International Symposium on Military Applications of Blast Simulation, Canada, September 1997.
- (10) R. Loucks, "*A Simplified Approach to Investigating an Explosion Source from the Effects to Buildings and Other Confined Structures.*" Proceedings of the Seventeenth International Symposium on Military Applications of Blast Simulation, Las Vegas, Nevada, June 2002.

VI. Research

Development of multi-phase cycle engine to efficiently convert junk heat into useable energy. Process involves low number of moving parts, economy of energy conversion, and more efficient use of fuel/heat source.

Optical filtration of weather impaired long distance, high magnification images. Use of Reynolds Averaging techniques and real-time empirical turbulence variance estimates to filter optical scatter and distortion.

Portable and removable blast hardening applicant for structures by use of plastically deforming springs in conjunction with plates to extend the blast impulse load on the structure.

Velocity and vorticity fields in a turbulent plane mixing layer by use of multi-sensor hot-wire anemometry measurements.

Micro-meteorological tactical level chemical, biological and radiological contaminant transport and dispersion model development.

Shock tube exit jet manipulation for non-ideal blast simulations.

Identification and location of supersonic projectiles by their acoustic signatures.

Vehicle and shelter roll-over, structural damage, passenger response, and thermal-blast synergistic effects from 4 KT nuclear blast simulations at White Sands Missile Range (Miser's Gold, Distant Image) using 4,900 lb ANFO and thermal radiation simulators.

Advanced large thermal radiation simulation using the combustion jet formed from an aluminum powder and liquid oxygen flame exiting a nozzle.

VII. Patents

Transducer Response Compensator, R. Loucks and L.G. Ferguson, 5823043, October 20, 1998

Acoustic Anemometer for Simultaneous Measurement of Three Fluid Flow Vector Components, R. Loucks, 6601447, August 5, 2003

VIII. Engineering Development and Design

Designed and fabricated a full-scale, non-ideal blast simulator at the end of the 1.68-m shock tube facility at R-11, APG.

Created a prototype thermal radiation source facility at Army Research Laboratory that has been duplicated for use in U.S Army Test and Evaluation Command (TECOM) Large Blast Thermal Simulator facility at White Sands Missile Range.

Conducted acceptance testing of a Science Applications International Company (SAIC) Thermal Radiation Source developed for the Centre' de Etude en Gramat, France.

Developed mathematics and interpretive software to translate accelerometer data into rotation and translation information from tumbling vehicle tests.

Conducted a review of 50 environmental remediation processes for suitability to DoD, DoI and GAO use. Consulted each developer in assessing the maturity of development, state-of-the-art and process for demonstration for funding.

Designed and installed Dewidag™ anchor tieback earth retention and installation system for AMTRAK Railways.

Designed and installed prototype wind tunnel insert for turbulent plane mixing layer studies at the University of Maryland at College Park.