

**Curriculum Vitae**



**EXPERIENCE:**

- \* Board-Certified Forensic Engineer with more than 45 years of experience in aquatic accidents and design, construction, and operation of swimming pools, spas, and related equipment, and other injuries related to swimming pools, pool equipment, or natural bodies of water.
- \* Registered professional engineer specializing in the design of public/commercial swimming pools, wading pools, spas, and related equipment. Founder and Principal of Rowley International Inc., an engineering consulting firm, 1974-2015. Designed more than 650 public pools/spas worldwide.
- \* From 1970 to 1980 was in charge of all engineering activities for Fluid Filtration Systems, engaged in worldwide industrial and commercial fluid filtration, and for Swimquip, the largest manufacturer of residential and commercial swimming pool equipment worldwide. In these positions, responsibilities included all company products from development to manufacturing.

**SPECIALTIES:**

- \* Drownings, Suction Entrapment, Quadriplegic Diving Accidents, Filter Explosions, Slips/Falls, and other injuries related to swimming pools and equipment, spas, hot tubs, waterslides, and natural bodies of water; Accident Reconstruction
- \* Swimming pool, spa, and related equipment design, construction, operation, failure analysis, construction defects
- \* Patents concerning swimming pools, spas, and related equipment
- \* Aquatic codes and standard of care
- \* CAD drawings
- \* Computerized Trajectory Analysis

**PROFESSIONAL ENGINEERING REGISTRATIONS:**  
(Active)

Arizona	EM #9329	12/14/73
California	ME#12864	02/15/63
California	CR #378	11/23/76
Colorado	PE #22523	05/11/84
Florida	PE #17881	11/03/72
Hawaii	PE #3621	07/18/74
Oregon	#14831PE	02/27/90
Texas	PE #34700	01/20/73
Washington	PE #34252	07/21/97

(Inactive)

Connecticut	PE #25027	06/01/06
Delaware	PE / ME #5022	04/08/76
Dist. of Columbia	PE #7538	01/25/80
Georgia	PE #8846	04/02/73
Idaho	ME #4092	04/20/80
Illinois	PE/ME #62-037684	04/06/79
Indiana	PE / ME #21193	01/04/85
Kentucky	PE/ME #10355	07/25/77
Maryland	PE #19798	04/17/93
Massachusetts	ME #42661	04/20/00
Michigan	PE #6201041460	12/07/95
Mississippi	PE #19383	09/30/09
Montana	PE #20202	06/01/11
Nevada	PE #4116	04/30/75
New Mexico	ME #5493	12/07/73
New York	PE #65284	01/25/89
Ohio	PE #65433	01/05/01
Pennsylvania	PE #19260-E	03/15/73
South Carolina	PE #20202	01/31/00
Utah	PE #346269	09/04/97
Virginia	PE #0402 038069	12/18/02
U.S. Virgin Islands	PE #1073-E	02/01/10
Wisconsin	PE/ME#16990-006	08/15/77

**BOARD CERTIFICATIONS:**

- \* Board-Certified Diplomate in Forensic Engineering Sciences (International Board of Forensic Engineering Sciences)
- \* Board-Certified Diplomate in Forensic Engineering (National Academy of Forensic Engineers)

**PATENTS:**

- \* 23 Patents Total: 13 U.S. Patents, 8 Canadian Patents, 2 Spanish Patents. The technical areas the Patents include are: Pumps, Hydraulics, Filtration, Valves, Packaging, Electrical Isolation and Safety. All of these patents became products manufactured by Swimquip (which was bought by Sta-Rite Industries; Sta-Rite Industries was eventually bought by Pentair Pool Products) that are sold in the United States of America and internationally.

**BOARDS AND COMMITTEES:**

- \* Board of Directors, National Swimming Pool Foundation (NSPF) 1983 - 2010
- \* Board of Directors, California Pool & Spa Association (CPSA) 1976 – 2015
- \* Executive Committee, California Pool & Spa Association (CPSA) 1976 – 2015
- \* U.S. Consumer Product Safety Commission's (CPSC) and National Spa & Pool Institute's (NSPI) National Swimming Pool Safety Committee (NSPSC) 1987 - 1997
- \* NSPSC's Steering Committee and Research Sub-Committee 1987 - 1997
- \* National Spa and Pool Institute's (NSPI) Technical Council 1974 - 1981
- \* International Association of Plumbing and Mechanical Officials (IAPMO), Uniform Swimming Pool Code Committee 1974 – 1981
- \* National Sanitation Foundation's (NSF) Standard Number 50 Joint Committee (Circulating System Components for Swimming Pools, Spas or Hot Tubs) 1974 - 1992
- \* Chairman, NSPF Aquatic Safety Compendium Committee 1995 – 2006

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**PROFESSIONAL MEMBERSHIPS:**

- \* Life Fellow, American Society of Mechanical Engineers (ASME)
- \* Fellow, National Academy of Forensic Engineers (NAFE)
- \* Member, International Board of Forensic Engineering Sciences (IBFES)
- \* Licensed Member, National Society of Professional Engineers (NSPE)
- \* Licensed Member, California Society of Professional Engineers (CSPE)
- \* Member, The Society of Forensic Engineers & Scientists (SFES)

**MILITARY SERVICE:**

MAJOR GENERAL, United States Air Force Reserve, Retired April 1992

1<sup>ST</sup> LIEUTENANT (1956-1958) – United States Air Force, Honorable Discharge. Research and Development Officer on classified U-2 Project in Germany.

**EDUCATION:**

B.E. IN MECHANICAL ENGINEERING, University of Southern California, Los Angeles, California. 1955.

AIR FORCE SQUADRON OFFICER SCHOOL, Air University, Maxwell Air Force Base, Montgomery, Alabama. 1963.

M.S. IN MECHANICAL ENGINEERING, University of Southern California, Los Angeles, California. 1964.

AIR COMMAND AND STAFF COLLEGE, Air University, Maxwell Air Force Base, Montgomery, Alabama. 1971.

NATIONAL SECURITY MANAGEMENT, Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, D.C. 1973.

AIR WAR COLLEGE, Air University, Maxwell Air Force Base, Montgomery, Alabama. 1979.

PH.D., ENGINEERING, Kensington University, Glendale, California. 1979.

**LIFE MEMBER:**

- \* International Eagle Scout Association
- \* The University of Southern California General Alumni Association

**PUBLICATIONS AND REPORTS:**

1. "Forensic Engineering Analysis of Cervical Spine Trauma, Specifically Quadriplegia and Other Paralyzing Injuries from Diving Accidents", Journal of the National Academy of Forensic Engineers, Volume 34, Number 1, June 2017.
2. "Preventing Structural Failures", Aqua Magazine, Volume 41, Number 4, April 2016, pages 67-71.
3. "High-Rise Performance", WaterShapes Magazine Volume 12, Number 8, November 2010.
4. "Dual Main Drain Suction Entrapment Test Report", International Journal of Aquatic Research and Education, Volume 2, Number 3, August 2008.
5. "Suction Entrapment", Chapter 7, National Swimming Pool Foundation's Aquatic Safety Compendium, 2006.
6. Suction Entrapment and Hair Entanglement / Entrapment, 2004, National Swimming Pool Foundation.
7. "Suction Entrapment", Chapter 7, National Swimming Pool Foundation's Aquatic Safety Compendium, December 2004. (Electronic Format)
8. "Reasonable Choices: An Expert's Perspective on Suction-Entrapment Issues", WaterShapes Magazine, Volume 6, Number 5, May 2004.
9. "A New Oasis" – Sierra Vista Aquatic Center, WaterShapes Magazine, Volume 4, Number 5, May 2002.
10. Dual Main Drain Atmospheric Vent Line: Preliminary Test Report, 2002, Florida Pool and Spa Association National Spa and Pool Institute.
11. Dual Main Drain Atmospheric Vent Line Preliminary Test Protocol, 2002, Florida Pool and Spa Association National Spa and Pool Institute.
12. Dual Main Drain Suction Entrapment-Hair Entrapment/Entanglement Test Report, 1997, National Swimming Pool Foundation.

**PUBLICATIONS AND REPORTS (CONTINUED):**

13. Aquatic Diving Performance, 1991, University of California, Los Angeles Department of Kinesiology. Prepared for the National Swimming Pool Foundation, Grant #W85 1125(B), San Antonio, Texas.
14. A Review of the Literature of the Effects of Alcohol as They Relate to Aquatic Skills Such as Diving Headfirst into Shallow Water, 1989, University of California, Los Angeles, Department of Kinesiology. Prepared for the National Swimming Pool Foundation, Grant #W85 1129, San Antonio, Texas.
15. Alcohol and Diving Performance, January 1987, University of California, Los Angeles, Department of Kinesiology. Prepared for the National Swimming Pool Foundation, Grant #W85 1125(A), San Antonio, Texas.
16. Designing Commercial Swimming Pools, Plumbing Engineering, Volume 9, No. 5, September – October 1981.
17. Doctoral Dissertation: The Mechanics of Hi-Rate Sand Filtration, William Nelson Rowley, Kensington University, Ph.D., 1979. Copyright 1979, Rowley, William Nelson L000338 University Microfilm International, 300 Zeeb Road, Ann Arbor, Michigan 48160 or 18 Bedford Row, London WC1R 4EJ, England.
18. A Parametric Approach to the Filtration of Swimming Pools, May 1977, National Swimming Pool Institute.
19. Primary Modeling Study of the Productivity of Top Minnows, March 1977, Hawaii Institute of Marine Biology, University of Hawaii, Keneohe, Hawaii.
20. Main Drain Tests with CPSC, February 2, 1977, Swimquip, Inc.
21. A Parametric Approach to Circulation System Design for Large Commercial Pools, November 1976, National Swimming Pool Institute.

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**PUBLICATIONS AND REPORTS (CONTINUED):**

22. Primer on Suction Entrapment in Swimming Pools or Therapeutic Pools, November 3, 1976, Swimquip, Inc.
23. An Analysis of Surface Debris Removal from Swimming Pools, August 1975, National Swimming Pool Institute.
24. The Mechanics of Hi-Rate Sand Filtration, 29 May 1975, National Swimming Pool Institute.
25. Swimming Pool Main Outlet Tests (Adjunct Report), August 22, 1974, Swimquip, Inc.
26. Swimming Pool Main Outlet Tests (Skimmer in line), August 22, 1974, Swimquip, Inc.
27. Swimming Pool Main Outlet Tests, July 23, 1974, Swimquip, Inc.
28. Swimming Pool Main Outlet Tests, June 11, 1974, Swimquip, Inc.
29. Swimming Pool Main Outlet Tests, June 6, 1974, Swimquip, Inc.
30. A Comparative Study of Recoverable Orbital Lifting Body Vehicles with Cryogenic and Storable Propellants, December 1966, SSD-TDR-669 (6520-10)-5.
31. A Parametric Analysis of Launch Vehicle Recovery Tradeoffs. 1 November 1963, SSD-TDR-63-315.

**OTHER REGISTRATIONS, LICENSES, CERTIFICATES:**

- \* BCSP Certified Safety Professional - #9731, 5/19/1990 - 12/31/2015
- \* National Engineering Council Certificate #2969, 9/29/1964 - 12/31/2015
- \* General Engineering Contractor (A) California #302451, 2/3/1975 (Inactive)
- \* Plumbing Contractor - C-36 California (Inactive)
- \* Solar Contractor - C-46 California (Inactive)
- \* Swimming Pool Contractor - C-53 California (Inactive)
- \* County of Los Angeles Health Department Certified Swimming Pool Service Technician - #T0326, 3/31/1983

**HONORS:**

- \* United States Air Force Distinguished Service Medal with one Oak Leaf Cluster.
- \* United States Armed Forces Legion of Merit.
- \* United States Armed Forces Meritorious Service Medal with one Oak Leaf Cluster.
- \* United States Air Force Commendation Medal.
- \* The National Sanitation Foundation (NSF) 1985 *Spes Hominum* (For the Good of Mankind) Award.
- \* California Spa & Pool Service Industry Education Council, Locksin Thompson Memorial Public Service Award. 1998.
- \* Citation Award, "Aquatic Safety", Southern California Public Pool Operators' Association. 1998.
- \* Visiting Distinguished Scholar, Advanced Water Treatment Lecturer, Mapua Institute of Technology, Inturamuros, Manila, Philippines. August 25, 1999.
- \* Honorary Doctor of Engineering, International Academy for Integration of Science and Business-Moscow, Russia. December 27, 2002.
- \* Joseph McCloskey Prize for Outstanding Achievement in the Art and Craft of Watershaping. June 2008.

**COMMUNITY ACTIVITIES:**

- \* Past President and Member of the Board of Directors of the University of Southern California School of Engineering Alumni Association.
- \* Charter Member of Archimedes Circle, a University of Southern California Engineering Support Group.
- \* Active in the University of Southern California and its various support groups and programs.

**PRESENTATIONS:**

- \* Society of Forensic Engineers & Scientists "Hair Entanglement" (with Matthew Reynolds, PE) Berkeley, California. November 2, 2018
- \* American Academy of Forensic Sciences "Engineering Investigations of Quadriplegic Diving Accidents" (with Dr. Laura Liptai and Jamie Norman) New Orleans, Louisiana. February 17, 2017
- \* National Academy of Forensic Engineers "Forensic Engineering Analysis of Cervical Spine Trauma From Diving Accidents" (with Dr. Laura Liptai) Dallas, Texas. June 25, 2016
- \* Lifesaving Society of Alberta & NW Territories "Anti-Entrapment" Calgary, Alberta, Canada. November 20, 2015
- \* World Aquatic Health Conference (National Swimming Pool Foundation) "Cervical Spine Trauma From Diving Accidents" (with Dr. Laura Liptai). Scottsdale, Arizona. October 8, 2015
- \* Society of Forensic Engineers & Scientists "Hearst Castle Neptune Pool Renovation" Kilauea, Hawaii. March 27, 2015
- \* Society of Forensic Engineers & Scientists "Suction Entrapment 101" Monterey, California. October 4, 2014
- \* World Aquatic Health Conference (sponsored by the National Swimming Pool Foundation [NSPF]) "Future Trends In The Aquatic Industry" Colorado Springs, Colorado. November 8, 2010
- \* World Aquatic Health Conference (sponsored by the National Swimming Pool Foundation [NSPF]) "Aquatic Suction Entrapment" Colorado Springs, Colorado. September 20, 2006
- \* Riverside County Health Department, "Dangers of Suction Entrapment". Riverside, California. Riverside, California. April 30, 2002.

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**PRESENTATIONS (CONTINUED):**

- \* Southern California Public Pool Operators' Association "Suction Entrapment". Los Angeles, California. 1998.
- \* Consumer Products Safety Commission Suction Entrapment Briefing, National Spa and Pool Institute. Bethesda, Maryland. 1996.
- \* Environmental Health Association-42<sup>nd</sup> Annual Educational Symposium - "Suction Entrapment." Long Beach, California, California. April 1993.
- \* National Aquatics Management School, "Looking Through the Architect's Eyes". Lake Arrowhead, California. 1990.
- \* Washington Recreation & Park Association (WRPA) Aquatics Sections Maintenance and Design Seminar "A Parametric Design of Circulation Systems for Maximum Energy Savings". Ellensburg, Washington. 1983.

**EDUCATIONAL INSTITUTION LECTURES:**

- \* Advanced Water Treatment, Mapua Institute of Technology, Inturamuros, Manila, Philippines. August 25, 1999.
- \* Harvard University-Graduate School of Design, "Campus Athletic and Recreational Facilities." Cambridge, Massachusetts. July 14-15, 1994 and July 26-28, 1996
- \* UCLA Extension, "Sports Facility Design and Management". Los Angeles, California. 1988.
- \* Ornamental Horticulture / School of Agriculture-California State Polytechnic University, Pomona PA 325 Aquatic Facility Management, "Construction of Outdoor & Indoor Swimming Pools". Pomona, California. 1987.
- \* University of California Los Angeles (UCLA) Extension Course, "Commercial Engineering" X492.5. Los Angeles, California. 1981.

**AERONAUTICAL ACTIVITIES:**

- \* Commercial Pilot: Airplane Single and Multiengine Land, Instrument, Rotorcraft – Helicopter #1250757 (Licensed Since July 1952).