Exponent®
Engineering & Scientific Consulting

Dennis Moore, Ph.D., P.E.

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Professional Profile

Dr. Moore specializes in mechanical and aeronautical engineering. He analyzes loads, forces, and temperatures induced by fluid flows; performs design and failure analysis on mechanical, combustion, and control systems; and conducts engineering investigations of fires and explosions.

Dr. Moore has expertise in modeling and analysis of vibration and dynamic systems. He has particular expertise in fluid mechanics (including steam and two phase flows), hydraulic and pneumatic systems, aerodynamic analysis, internal combustion engines, and aviation accident investigation.

Prior to joining Exponent, Dr. Moore was Lead Mechanic for El Toro Marine Corps Flying Club, an Aerodynamicist and Systems Engineer for the E-Z Hook/Kawasaki Land-Speed Motorcycle, and a technician in the GALCIT 10-foot wind tunnel. In addition to his work at Exponent, Dr. Moore has been Director of Maintenance for Lenair Aviation, Inc., and he continues to work in the aviation maintenance field.

Academic Credentials & Professional Honors

Ph.D., Aeronautics, California Institute of Technology (Caltech), 1996

M.S.E., Mechanical and Aerospace Engineering, Princeton University, 1988

B.S., Mechanical Engineering, Princeton University, 1987

Tau Beta Pi, National Engineering Honor Society

Phi Beta Kappa, National Scholastic Honor Society

Von Karman Fellowship, California Institute of Technology

General Motors Fellowship, Princeton University

Joseph Clifton Elgin Prize, Princeton University, 1987

George Bienkowski Memorial Prize, Princeton University, 1987

"Best Project" MAE 411 Microprocessor Systems Engineering, 1987

Licenses and Certifications

Professional Engineer, Alabama, #PE28084

University of Southern California Aviation Safety and Security Certificate including: Aircraft Accident Investigation

FAA Airframe and Powerplant License

FAA Inspection Authorization

Fire Investigation 1A (Cause and Origin), California Office of State Fire Marshal

PADI Certified Open Water Scuba Diver

Professional Affiliations

American Institute of Aeronautics and Astronautics (member)

National Fire Protection Association (member, sits on the NFPA 410 Committee, Aircraft Maintenance)

Professional Aviation Maintenance Association

Publications

Moalli J, Reitman M, Robertson C, Moore D. Failure analysis of nitrile radiant heating tubing. Proceedings, ANTEC 2006, Charlotte, NC, Society of Plastic Engineers, May 2006.

Moore D. Experiments in axisymmetric supersonic jets. Ph.D. Thesis, California Institute of Technology, 1996.

Moore D. Some results in supersonic jet mixing. Proceedings, Eighth Office of Naval Research Propulsion Meeting, La Jolla, CA, October 1995.

Moore D. A plating method for the construction of high-precision nozzles. Proceedings, Seventh Office of Naval Research Propulsion Meeting, Buffalo, NY, August 1994.

Moore D. Effects of a longitudinal heating element on a laminar boundary layer over a flat plate. M.S.E. Thesis, Princeton University, 1988.

Moore D. Construction of a real-time data compression circuit. B.S.E. Thesis Princeton University, 1987.

Presentations

Moore D. Piston aircraft engines: Past, present, and future. California Polytechnic State University, San Luis Obispo, CA, October 24, 2007, February 20, 2008.

Moore D. Piston aircraft engine technology. California Polytechnic State University, San Luis Obispo, CA, May 25, 2007.

Moore D, Pettinger A. Supplemental type certificates: Understanding and assessment. 40th Annual SMU Air Law Symposium, Dallas, TX, February 2006.

Moore D. Engineering participation in NTSB investigations. D.R.I. Products Liability Conference, February 2002.

Mikolajczak C, Moore D. The aircraft cargo hold environment: The implications of a fire on lithium-ion battery shipments. Long Beach Battery Conference, January 2002.

Moore D, Meyer A, Kadlec R, Westmann R. Changing paradigms in aviation accidents. 31st Annual SMU Air Law Symposium, Dallas, TX, February 1997.

Moore D. Trials and tribulations of a land-speed motorcycle. AE 150 Seminar, California Institute of Technology, May 1994.

Project Experience

Analyzed a Supplemental Type Certificate cargo door installation on a B-737 for compliance with the FAR's. The adequacy of the loads development and the structural engineering of the door were evaluated.

Investigated the crash of a homebuilt aircraft. The causes of the engine failure prior to the crash, the flight path of the aircraft, and the actions of the pilot were analyzed.

Investigated carbon monoxide poisoning incidents with internal combustion engine powered equipment. The emissions of the engines as designed and as maintained were evaluated. The ventilation of the areas in which they were used was analyzed.

Investigated the cause and origin of a fire at a petrochemical stank farm. The source of volatiles in the headspace and the ignition source were determined.

Analyzed the flight path and runway performance of a DC-8 that crashed while attempting to take off on a three-engine ferry. The performance of the aircraft, the adequacy of the procedure, and the certification of the aircraft were examined.

Investigated the crash of a F-90 King Air. The certification of a Supplemental Type Certificate for an engine swap, the performance of the fuel control system, and the performance of a propeller governor were analyzed.

Investigated the crash of a Cessna 404 Titan. The torsional vibration characteristics of the engine crankshaft, the aircraft performance on one engine, and the maintenance of the engines were evaluated.

Analyzed the fuel system performance of an automobile. The pressure drop through the filter with varying amounts of contamination and the engine reaction to a high resistance filter were tested.

Analyzed the design and performance of aircraft hydraulic systems. The characteristics of the servo valves, the resistance to jams, and the consequences of jamming were investigated.

Acted as the arbitrator in a dispute over the cause of damage to an aircraft APU. The relationship between damage to one part of the turbine and the others were analyzed.

Investigated the causes of numerous turbine helicopter engine failures. Analyzed the relationship between operational, design, manufacturing, and maintenance factors.

Investigated a parasailing accident. Tested the stability of a parasail and measured the forces on zippers controlling vent openings.

Analyzed the functionality of a trademarked truck trailer design with respect to aerodynamics and structural benefits. Compared the aerodynamics and structural weight of various design options.

Evaluated the design and operational history of target drones. Evaluated the performance with surface defects, examined in-service targets, evaluated the engine reliability, and analyzed the maintenance practices.

Calculated the flight path of many commercial and general aviation accidents, using performance data, radar data, and Digital Flight Data Recorder information, when available.

Evaluated the structural adequacy of a B-747 cargo door Supplemental Type Certificate. Loads experienced during in-service events were calculated, structural components tested, and analysis of the static load carrying capacity of the structure was performed, and a comparison between the results and the FAR certification requirements was made.

Investigated the failure of in-floor hydronic radiant heating systems. Home sites were inspected, the mechanical designs were evaluated, and operational data was collected from several home sites. Laboratory testing of a system was performed and the effect of varying component type and/or location on the hydronic hose was evaluated.

Analyzed the mechanical design of exercise equipment for safety. The cause of an accident that occurred during use of the equipment was evaluated.

Investigated the causes of mishaps related to systems controlled by PLC’s. These mishaps have included boiler explosions, shiploader failures, and aircraft boarding bridge failures. The sensor inputs and the programming of the PLC’s was evaluated.

Investigated the cause of a BE-1900 crash. The stability and control of the aircraft and the maintenance role in the accident were investigated.

Investigated the cause of a hot water tank failure and subsequent steam explosion. The causes for the presence of superheated water in the tank were determined and the energy released calculated.

Evaluated the design of a specialty gas mixing manifold. The role of personnel and failure of safety devices in the explosion of a set of hydrogen filled bottles was analyzed.

Investigated the cause of propane release in several different instances. The design of the valves, potential overfilling, and maintenance of the tanks were evaluated.

Evaluated the role of maintenance personnel in several general aviation accidents. Compliance with airworthiness directives, service bulletins, and general standard-of-care were examined. The consequences of any lapses with respect to individual accidents was analyzed and/or tested.