Romualdi, Davidson & Associates
Consulting Engineers

David J. Bizzak

P.E., C.F.E.I., C.V.F.I., Ph.D.
Mechanical Engineering, Principal
Email: daveb@rdaweb.com

Areas of Specialization

Analysis of machine and consumer product design/manufacturing defects, analysis of automotive defects, traffic accident reconstruction, system failure modes and effect analysis (FMEA), system design and reliability, human factors, and stress analysis.

Professional Registration

Registered Professional Engineer (Pennsylvania, South Carolina and Mississippi)

Educational Background

Ph.D. - Mechanical Engineering 1993, Carnegie Mellon University

M.S. - Mechanical Engineering 1989, Carnegie Mellon University

B.S. - Mechanical Engineering 1982, Texas A&M University

Employment History

Romualdi, Davidson & Associates, Inc., 1994-Present

Independent Engineering Consultant, 1988-1993

International Technology, 1987-1988
Staff Consultant, Risk Control Services

Delian Corporation, 1982-1987
Engineering Consultant

Professional Experience

Conducted engineering investigations related to a variety of litigation issues including: reconstruction of industrial accidents, machine design and machine guarding, automotive design and manufacturing defects, faulty or improper maintenance responsible for machine or automotive system failures, pedestrian slip-and-fall accidents, and consumer product design and manufacturing defects.

Investigated accidents associated with various industrial machines, such as mechanical and hydraulic presses, plastic injection molding machines, various special-purpose industrial machines, conveyor systems, agricultural machinery, materials handling systems, fork lifts, scissor lifts, skid-steer loaders, backhoes, excavators, dump trucks, cranes, augers, power hand tools, pneumatic chipping hammers, etc. The technical analyses performer in these accidents have included evaluation of machine design, guarding, adequacy of system or machine controls, machine maintenance, and causes of specific component failures.

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Engineering investigations of golf car accidents have included performance testing and design evaluations of specific components and subsystems of electric- and gasoline-powered cars. Similar design evaluations have been performed on components and/or systems of motorcycles, all-terrain vehicles, and riding lawn mowers.

In course of engineering investigations have developed protocols and conducted instrumented tests to aid reconstruction. Such testing has included temperature profile monitoring of heating/cooling coils of an HVAC air handler in which low-temperature freeze failures had occurred, skid tests of automobiles and heavy trucks to determine braking capabilities, friction tests of footwear material/flooring surfaces, vehicle performance tests to assess acceleration properties of specific vehicles, and monitoring of vehicle power-train control module (PCM) inputs/outputs to establish nominal voltage profiles and/or detect system abnormalities.

Responsible for extensive technical analyses, laboratory testing and vehicle testing to identify the proximate cause of sudden acceleration incidents (SAIs) in a population of vehicles that exhibited an elevated reporting rate of SAI. Other vehicle defect investigations have included analysis of alleged braking and steering system malfunctions.

Evaluated adequacy of the technical design of a variety of consumer products or components of a product. Examples of such investigations have included the blade retention device of an utility knife, seat retention mechanisms on exercise machines, motorcycle/ATV throttle components, adequacy of guarding and warnings or corn pickers, and a chain retention mechanism on an automotive collision repair device.

Pedestrian slip-and-fall evaluations have included evaluation of friction required to support normal human gait, effects of floor surface elevation changes, evaluation of stairway and handrail design, field testing of floor surfaces to determine static coefficient of friction, testing of pedestrian footwear to determine static coefficient of friction against floor surfaces, and testing to evaluate effect of debris on static coefficient friction of walkway surfaces.

Performed reconstructions of over 350 traffic accidents involving analyses related to the following: single- and multi-vehicle accidents, automobile-pedestrian accidents, automobile-bicycle/motorcycle accidents, heavy truck accidents, vehicle and pedestrian speeds, low-speed collisions, computer modeling of single and multi-vehicle collisions, automotive mechanical failures, vehicle crashworthiness, sight distance, nighttime visibility, and traffic signal operation.

Developed and demonstrated a highly accurate laser-induced fluorescence (LIF) thermal imaging system designed to provide two-dimensional remote temperature measurement with a high degree of spatial resolution. The basic design concepts validated by this effort were to be employed in a planned turbine test research facility to be constructed at the Wright Patterson Air Force Base.

Evaluated the benefit of replacing automobile OEM windshield glass with an improved solar heat-rejecting glass in terms of air conditioning system performance and efficiency gains. Provided guidance to PPG Industries for the instrumentation of test vehicles and for the reduction and presentation of test data.

Performed and/or reviewed the human error analyses for several nuclear power plant probabilistic risk assessments (PRAs). These analyses, designed to quantify the probability of human error, consisted of a critical evaluation of the human-machine interface, time available for human action and the influence of stress and other performance shaping factors on human response.

Conducted analyses to resolve numerous engineering issues associated with nuclear power plant emergency procedure modifications at the Ginna nuclear power station. For example, assessed the adequacy of the Ginna nuclear power station emergency core cooling system to provide long-term cooling in the event of a loss-of-coolant accident.

As a lead technical analyst, supported development of Level 1 probabilistic risk assessments for several nuclear power stations. Responsibilities encompassed development of logic models to depict impact of component failures on complex systems, compilation of plant-specific component failure rate data, determine nuclear power plant response to anticipated transients, development of a methodology for quantifying dynamic and latent human errors that affected system operation or plant response and quantification of the probability of potential nuclear power plant accident sequences.

Served as technical expert for the International Atomic Energy Agency (IAEA). In the capacity of a nuclear risk assessment expert, assisted the Jozef Stefan Institut (Ljubljana, Slovenia) in their efforts to develop a Level 1 PRA for the Krsko nuclear power station.

Served as lead analyst and technical manager in an Electric Power Research Institute (EPRI) research project. Responsible for the development and demonstration of a methodology for applying probabilistic risk assessment techniques to resolve technical specification problems.

Developed a scheme to use plant-specific risk assessments to estimate the safety significance of proposed plant improvements, which served as one input for an Integrated Living Schedule Program (ILSP) used by Philadelphia Electric to prioritize projects for resource allocation.

Professional Affiliation

American Society of Mechanical Engineers
Society of Automotive Engineers

Honors

Tau Beta Pi
Sigma Xi
NASA Graduate Student
Research Fellowship
U.S. Air Force Summer
Research Associate

Teaching Experience

University of Pittsburgh
ME 1042 - Mechanical Measurements II (senior-level engineering laboratory)
ME 2053 - Advanced Heat Transfer (graduate-level heat transfer)