



**Jack W. Sparks, Ph.D., PE, RG, RM**  
President and Principal Engineer  
**SERF, Systems Engineering Research Facilities, Inc. – Since 1972**  
P.O. Box 59, Cantonment, FL 32533  
850-476-8203

Licensed Professional Engineer:

Registered Professional Engineer, Fla. PE 16877, 1972  
Registered Professional Engineer, AL, 28115-E, 2006  
Registered General Contractor, Fla. RG 61440, 1990  
Registered Mechanical Contractor, Fla. RM 60577, 1990.

Expert Witness and Consultant in the States of:

Alabama, Florida, Mississippi, Louisiana, Georgia and Wyoming

Education:

University of Florida  
Doctor of Philosophy in Mechanical Engineering, 1970  
Masters of Science in Mechanical Engineering, 1967  
Bachelor of Mechanical Engineering, 1965

Field of Practice:

**Forensic Engineering Analysis**, Accident Reconstruction, Mechanical and Machine Design, Thermal and Fluid Systems, ASME Pressure Products, Pneumatic and Mechanical Conveyors.  
**Principal Design Engineer** for Process Tanks and Piping Systems, Conveying Equipment and Machinery, Heavy Lifting Equipment and Structural and Mechanical Applications at SERF, Inc.

Professional Service: \*Past Service

University of Florida Mechanical Engineering Advisory Committee  
Engineering Service Advisor to the University of Florida ERC.  
\*Technical Advisor to the UWF Technology Council.  
\* Advisor to the Pensacola Junior College Welding Department

Professional and Honorary memberships:

American Society of Mechanical Engineers, American Welding Society, Society of Automotive Engineers, Society of Accident Reconstructionists, Association for the Advancement of Automotive Medicine, National Association of Professional Accident Reconstructionists. Pi Tau Sigma, honorary Engineering Fraternity.

Journal of Publications:

Journal of Applied Mechanics, 1968. Journal American Society of Mechanical Engineers, 1968.  
Journal of Mechanisms, 1967 and Yugoslav Council for the Theory of Machines, 1968.

Research Experience- University of Florida:

Kinematics, Mechanisms and Machine Design, 1965-1970. Solar Energy  
Analysis & Fallout Shelter Analysis, 1967-1968. Thermal Energy Analysis for Large Building, 1965-1967

Teaching Experience (Partial) ó Adjunct Professor ó University of West Florida:

**Machine Design and Analysis** ó Tension and Compression Stresses, Shear and Bending Moments, Types of Failure, Material selection and ASME code, Testing requirements, Steel Shapes and Shafting, Deflection and Buckling, Stress Analysis and Fatigue, Design Safety factors, Vibration, Impact and Shock, Energy for Deformation and Shearing.

**Design Applications** ó Shafting, springs, fasteners, belts, clutches, brakes, chain, welded connections, bearings, gears, Wire rope, and Engineering materials and Selection.

**Fluids and Hydraulics** ó The properties Fluids and Gases, Applications for transferring power and heat, The use and characteristics of Pumps and Compressors, Flow of liquids and gases in pipes, channels and over surfaces, Compressible and Incompressible flow, Pump head and NPSH applications.

**Heat Transfer** ó Conduction, Convection and Radiant heat transfer, Mass and heat transfer, Solar and Radiant heat transfer applications, HVAC systems Load and Humidity determination. Applications and Types of heat exchangers, and Boiler systems.

**Economy Engineering** ó Financing Interest rates and final cost of Equipment, Present cost and Future cost, Return on Investment, The cost of manufacturing and construction, The cost of Operations, The cost of services including utilities, variable and fixed costs, Investment analysis, Profit and, Loss statements.

## **Traffic Accidents Reconstruction, Biomechanics of Injury and Vehicle Components Specialized Training and Certifications**

### **Traffic Accident Reconstruction and Investigations**

Traffic Accident Reconstruction, Energy and Momentum, Drag Factor and Coefficient of Friction, Vehicle Dynamics, Oblique and Collinear Collisions, and Speed from Damage, University of California at Riverside, 2004

Accident Reconstruction, Toptec special topics, SAE 2001, Pedestrian, Bicycles, Motorcycles, Tires, Brakes, Heavy Trucks and Human factors

PcCrash, MEA 2004, Computer Vehicle accident reconstruction 2D and 3D simulations for walls, side, front, rear rollover, steering path, occupant modeling, & Scale rectification of skids, MEA 2004

Truck Accident Litigation, Truck Litigation Resource, 2002, Inspection, documentation and logs required by drivers and vehicle owners. Legal issues to properly defend parties subject to litigation.

### **Vehicle Component Design, Application and Performance**

Vehicle Safety Restraint Systems Performance, SAE 1999, Seat Belts and Air Bags ó types, designs, loading, time and movement of occupants, injury mechanics, dynamic response to loading and unlatching characteristics of belt latch types. Inspection post impact for belt use verification and documentation.

Air Bag Design and Performance, SAE 1997

Driver side and passenger side air bag design, time to deploy, occupant position, loading duration and injury prevention. Live deployment demonstration of air bag system.

Sensor Design for Automotive Air Bag Systems, SAE 1999

Sensor types, vehicle placement, time response and application. Occupant position at time of activation and final deployment. Frontal and side impact applications.

Brakes, SAE 2002 - Design and Safety, Accident causation, Commercial vehicles, ABS Systems, Stability, Component failure and Defects

### **Biomechanics of Injury and Occupant Kinematics with Impact Analysis**

Injuries, Anatomy, Biomechanics, & Federal Regulations-SAE, 1996

Federal regulations for the design of seat belts, air bags and crush into the occupant space. Injuries to internal organs, cervical, thorax and lumbar spine. Head face, eye and brain injury determination. Long bone, rib fractures, feet, arms and knee injuries. The use of padding and the prevention of hard contact zones predicted in the Biomechanics of the collision. Federal standards required for testing the vehicle and components designs and compliance. Data bases available for Biomechanics analysis for low impact velocities and barrier impact testing using instrumental dummies.

Low Speed Collision, Biomechanics & Whiplash-SAE, 1996

Whiplash, permanent and temporary injures, soft tissue injures from low impact collisions. Analysis methods to determine injury thresholds from vehicle components and damage. Low impact collision demonstration, video demonstration of body movement.

TEEX ó (Texas A & M) Biomechanics for Traffic Accident Reconstruction, 1998

Vehicular impact mechanics to the human anatomy, occupant movement within the vehicle, interior assessment of points of impact, data for injury evaluation based upon impact force and duration of time. Effect of restraints ó air bags and seat belts in roll over, air bag deployment, time, position, and occupant movement. Post accident injury analysis from photos, x-rays, MRI data and autopsy reports.

AAAM- (University of Maryland Medical School) Biomechanics of Impact Trauma, 1998

Biomechanics analysis based upon impact trauma and vehicle design and performance to determine the injury mechanics of the human anatomy. Injury data from physical testing and computer modeling has been tabulated to provide thresholds of injury to the skeleton and the bodies internal organs, cervical injury due to whiplash, blunt trauma to the head, thorax and ribs cage, internal organs, face and eyes. Brain injuries caused from acceleration and impacts to the head can be determined and evaluated by engineering analysis and accident reconstruction based upon the vehicle collision, the vehicles design, damage and injury mechanics.

University of California School of Medicine, Accidental Injury: Biomechanics & Prevention, 1999

Human anatomy and injury mechanics are combined to provide a Biomechanics analysis of automotive accidents. Injuries to the face, eyes, head, brain, cervical, thorax and lumbar spine are evaluated based upon physical data, human testing and instrumental dummies under impact simulation. Injury to internal organs, heart, liver, spleen and lungs are evaluated from cadaver tests and autopsy. Skeletal injuries to ribs, sternum, long bones, head, feet and ankles are tabulated for vehicle delta-velocity. Airbag and seat belt injury prevention mechanics and methods to determine use are provided for accident reconstruction.

Biomechanics of Injury from Traffic Collisions-NIFS, 1997

Injury mechanics of impact to the human anatomy, head, cervical spine and thorax, long bones and rib cage. Internal organ injuries, eye and facial injuries from impact and air bags. Torso injuries from seat belt loading and Delta-velocity vs. expected injuries. Vehicle impact and movement of occupants restrained and unrestrained. Safety belt function, performance, loading on impact, release mechanisms and belting material inspection for loading to determine use.

Occupant and Vehicle Kinematics in Rollovers, SAE 2005

Real world Rollover studies, Seatbelt and Ejection, Rollover types, Roof Crush, Far v. Near Side Kinematics, J-turns And Fishhook turns, Tripping condition, Rollover Sensing and Algorithms, Rollover safety restraints, Computer Modeling PC-Crash and MADYMO

Clinical and Biomechanical Aspects of Lower Extremity Injuries, Wayne State University, School of Medicine, 2000

Impact injury mechanics of the Lumbar spine, Pelvic, Legs, Knees and Feet.

Forensic Analysis of Medical Records in Injury Biomechanics and Accident Reconstruction, SAE 2006

Narrative records, Types-EMS, ER Surgical Report, Progress Notes, Discharge Summary. Imaging and Radiology Reports, Disease, Aging and Pre-Existing Conditions, Medical Record Analysis.

## **Florida Engineering and Construction Licensing Boards Specialized Training and Certifications**

### **OSHA Construction Safety Laws and Responsibility**

Construction Safety & Health OSHA Certificate, 1994

Contractors are by law (OSHA 1926) subject to providing a safe working environment including personal safety equipment, working above 6 feet height, ladders, scaffolding, electrical power and lockout, lifting equipment, cranes, rigging, confined space and below grade elevation, air quality and sound environment.

Ethics & Responsibilities of the Contractor, 1995

Contractor's responsibility by contractual agreement, which includes ethics and responsibilities implied in the law, building codes and standards of construction.

Arbitration & Mediation in construction, 1996

Disputes between contractors, subcontractors and owners including proposals, standards, law and ethical resolve. Means of solving disagreements by contracts and mutual understanding to avoid court intervention.

Fundamentals of Construction Design, Worker's Compensation and Workplace Safety, 1998

Basics for Contractors, Laws & Safety, FCILB, 2001

Construction Business Management, FCILB, 2001

Understanding OSHA, Understanding Worker's Compensation and Green Marketing ó OSHA Subpart C 29 CFR

1926.1 ó 1926.35, The General Duty Clause, Safety and Health Program, Fire Protection and Prevention, housekeeping, Personal Protective Equipment, Training and Education, Inspections, Citations, and Record Keeping. University of Florida Ext. Services, 2005

OSHA Confined Space Training, 29 CFR 1910.146 ó Permits, Procedures, Enclosure, Authorized Entry, Safety Watch, Ventilation, Fire and Explosions, Minimum Air Standard, Oxygen Meter, Standard Rescue Access. Emergent Enterprises 2006.

### **Crane Inspection, Training, Operation and Safety**

óCertified Mobile Crane Inspectorö Crane Inspection and Certification Bureau, 2007

Equipment ó Mobile Hydraulic and Mechanical cranes

OSHA ó Crawler cranes, Truck cranes and Derrick cranes and the Power Crane and Shovel Association

ANSI, ASME ó Hooks, Rigging & Components

Inspections ó Safety devices, Electrical, Auxiliary, Structural & Hoisting Systems, warning labels and decals

Manufacturers' Specifications ó Design, Load charts, Lift operation and Maintenance

Crane Inspection and Certification Bureau öMobile Crane Managementö, 1999

Crane management including inspection and operations, training, qualifications, OSHA, and ANSI standards for mobile, derrick, track and truck cranes. The inspection and applications of wire rope, rigging, slings, personal protection equipment, signals, power lines and transporting/moving equipment. Calculations of load, equipment's load chart and outriggers' restrictions for tipping and mechanical limitations. The use of lift plans, hand signals, radios barriers and markers for compliance with OSHA safety.

### **Engineering and Construction Codes and Standards**

Building/Structural, University of Florida Extension service, 2002

Standard Building codes for wind, floor and attic loading, windows and doors, building attachments for frame constraints for homes, metal buildings and block construction. Foundation built-up, slab and frame type.

Electrical Codes & Plan Interpretation, FCILB, 2000

Building codes for electrical panels, wiring, outlets, lighting, ground fault breakers, load calculations, testing and inspection.

Heating Boilers; Construction, Care and Operation ASME Sections IV and VI, ASME, 2001

ASME codes and standards for inspection, repair, service and testing of heating boilers and hot water heaters, including welding, qualifications, procedures and documentation.

Pressure Vessel Alteration and Repair, ASME, 1983

Inspection, repair, welding specification, welding procedures, welder qualifications and records, testing and documentation for ASME code and the National Board of Boiler and Pressure Vessel Inspectors.

Plumbing and Fuel Technical, University of Florida Extension service, 2002

Application of the building codes to the standards for the selection, installation, inspection and testing of plumbing and fuel equipment and appliances.

Mechanical Energy ó Florida Building Code, Electrical, Plumbing, Fuel, NFPA, Hazards, Guards, Ventilation, Combustion air, Boilers and Hot Water Heaters. University of Florida (FEES), 2002

Energy ó Residential Energy Uses and Consumption, Air Changes, Stack Effect, Cooling, Heating, Refrigeration, Water Heating, Lighting, Ratings of Equipment, Conduction, Convection and Radiation, Humidity, Thermal Insulation, HVAC Systems, Windows, Solar Heat Gain. University of Florida Ext. Services, 2005

Florida Building Code Residential Overview ó Administration of Building construction, Foundations, Walls, Roof-Ceiling, Roof Assemblies, Swimming Pools, and Plumbing. Inspection of Foundations, Electrical, Mechanical, Gas, Frame, Roofing and Final Inspection. University of Florida Ext. Services, 2005

Design for Absolute Humidity Control ó Humidity control, ventilation air treatment, dehumidification technologies (desiccant and mechanical) and psychometrics. ASHRAE, Pensacola, FL 2005

Advanced Code - Building/Structural, Contractors Institute, 2006

New building code implementation for Florida, specific to the new wind code requirements for hurricane resistant buildings

Controlling Chillers in Primary only CHW Systems ó ASHRAE, 2006

Chiller control on load demand based upon time, history and instrumentation

Selecting Valves for Variable Flow Systems ó ASHRAE, 2006

Optimizing valve design selection for controllability of thermal heat/cool sources.

Outside Air Ventilation ó ASHRAE, 2007

Controlling outside air temperature and humidity including adverse conditions of weather and occupant loading.

Computer aided Residential Design, 1999

Methods for utilizing CAD systems for designing homes for wind, HVAC, electrical and plumbing requirements

### **Forensic Engineering Construction**

Building/Fire, University of Florida Extension service, 2002

Building code standards for fire rating, prevention, egress, signs, inspection and safety applications for plumbing, heating, electrical and combustion sources.

Fracture Mechanics Approach to Life ó Prediction Linear Elastic Fracture Mechanics, Fatigue Initiation, Fatigue Crack Growth, Stress Concentration Effect of Flaws, Life Prediction, Stress Corrosion Cracking, Variable Amplitude (Cyclic) Loading, Fracture control, Fatigue design. ASME, 2004

Wind Load Calculations and other Wind Issues ó Wind characteristics, Codes and standards, Structural characteristics, Structural analysis examples Group activities, Wind analysis software, High-rise buildings, University of Florida, 2007

Forensic Engineering in Building Inspection ó Damage from Moisture and Water in Building walls, Windows, Doors, Terminations, Connections, Construction procedures and installation. American Society of Heating, Refrigeration and Air-Conditioning Engineers, 2005

Mold, Moisture, Indoor Contaminants - Flood Water Damage ó Dangers, Construction techniques, Site evaluation, inspection Procedures & protocols, Procedures to remediate, Design deficiencies and improper structure maintenance, Liability and Risk. Contractors Institute, 2006

Indoor Environmental Quality ó Investigation and Re-mediation of Indoor Air Pollution, Moisture, Mold, Combustion Gases, CO Carbon Monoxide, Biological Contaminants, VOCs, Formaldehyde, Radon, Ozone, Asbestos and Lead pollution. University of Florida Ext. Services, 2005

Building Pressurization ó ASHRAE, 2007

Methods to maintain internal building pressure and equalization utilizing fan and flow control.

Lead and Remodeling ó Lead applications in the home, Testing, identification and re-mediation, location of Lead and abatement, Methods of removal, OSHA Law, EPA Pre-Renovation Education Rule. University of Florida Ext. Services, 2005

Termites in Florida ó For Homeowners and Building Professional, Understanding Florida Termites, Subterranean Termite Control, Treatment Methods and Practices, Tips to Avoid Termites Trouble, University of Florida Ext. Services, 2005

## LECTURES IN ENGINEERING

- 1984 - "Selecting an Expert Witness" Jack W. Sparks, Ph.D., PE  
The Mobile Claims Association, Mobile, Alabama
- 1991 - "Harbert S. Gregory Distinguished Lecture Series" Jack W. Sparks, Ph.D., PE  
University of Florida, The College of Engineering, Gainesville, Florida
- 1993 - "Designing and Building Mechanical Equipment for Today's Industries" Jack W. Sparks, Ph.D., PE  
American Society of Mechanical Engineers, Pensacola Section, Florida
- 1995 - "Forensic Engineering" Jack W. Sparks, Ph.D., PE  
American Society of Mechanical Engineers, Mobile Section, Alabama
- 1995 - "Designing and Building Mechanical Equipment for Today's Industries" Jack W. Sparks, Ph.D., PE  
American Society of Mechanical Engineers, Mobile Section, Alabama
- 1995 - "Forensic Engineering" Jim Anderson, Richard McSwain and Jack W. Sparks  
American Society of Mechanical Engineers, Pensacola Section, Florida
- 1998 - "Accident Reconstruction - Cause and Origin" Jack W. Sparks, Ph.D., PE  
The Pensacola Claims Association
- 1997 - "Forensic Engineering and Accident Reconstruction" Jack W. Sparks, Ph.D., PE  
American Society of Mechanical Engineers, Pensacola Section, Florida
- 2000 - "Air Bags - Performance and Failure Analysis" Jack W. Sparks, Ph.D., PE  
American Society of Mechanical Engineers, Gator Section, Gainesville, Florida
- 2001 - "Testing Methods for Failure Analysis in Accident Reconstruction" Jack W. Sparks, Ph.D., PE  
American Society of Nondestructive Testing, Emerald Coast Section
- 2001 - "Forensic Engineering" Jack W. Sparks, Ph.D., PE  
Northwest Florida Association of Private Investigators  
Annual Florida Certified Investigators (FCI) Seminar

**Jack W. Sparks, Ph.D., P.E., RG, RM**  
**INDUSTRIAL EXPERIENCE**

**PRINCIPAL ENGINEER**

**PROCESS SYSTEMS DESIGN**

- Radioactive Waste Concentration Systems
- Recovery of Plating Waste
- High Temperature for Seawater Conversion
- Textile Finish Waste Recovery
- Fuel In Flight Simulator for the F-15 Eagle
- Brine Freeze System For Saltwater Conversion
- Molten Salt Bath Heating System
- Agitation Cleaning Systems for Aircraft Parts
- Computer Controlled Pumping Systems
- Citric Acid Hot Wash System for Ship Cleaning
- Containerized Vacuum and Pressure Tank Systems
- Power Boiler Venturi Scrubber Systems Controls
- Environmental Control Chamber for Critical Machining Manufacturing
- Fuel Haulers for the Space Shuttle Support Vehicles

**MATERIAL HANDLING SYSTEMS**

- Computerized Conveyor System for containers
- Handling in a Large Textile Plant
- Activated Carbon Handling System for Water Filtration Plant
- Bulk Bag Loading and Weighing Station With Computerized Automation
- Pneumatic Convey System that Weighs, Feeds, and Inventories for Selected Silo Systems
- Large Robotic Positioning System for Welding of Heavy Components for Missile Launcher
- Live Bottom Hopper Feed Systems for Ammunition Production
- Large Screw Conveyor for Explosive Powders
- Vacuum Pneumatic Loaders for Material Conveying
- Overhead Tote Bin Loading Station and Conveying
- Drag Conveyor for Coal and Ash Handling System
- 1,100,000 Lb. (3) Crane Lift Fixture
- Belt Conveyors
- Dump Hoppers

**ASME CODE PRESSURE VESSEL DESIGNS**

- 32000 Lb. Jacketed Lead Lined Reactor for R-2 Chlorine Generation
- Hyperbaric Fire Tanks, Water Tanks, Waste Tanks For Manrated Diving Chambers
- Rotary Multi-Tube Digester Converting Wood Chips
- Nuclear Waste Resin Separation Pressure Vessels For Primary Loop Water in Submarine Service
- Titanium Scrubbing Column with Packing and Separation Processes
- Titanium Adsorber for Chlorine Dioxide Service
- Refrigerated Reactor for Process Development High Temperature-Altitude Simulator for Fuels R&D

**Jack W. Sparks, Ph.D., P.E., RG, RM**  
**ACCIDENT RECONSTRUCTION – FAILURE ANALYSIS**

**FORENSIC ENGINEERING – EXPERT WITNESS**  
**29 YEARS EXPERIENCE**

**Courtroom Testimony – Defense and Plaintiff cases**  
***County – State – Federal***

**Expert Engineering Services**

- Florida
- Alabama
- Mississippi
- Louisiana
- Georgia
- Virginia
- Pennsylvania
- Kentucky
- Tennessee
- West Virginia
- New York
- Connecticut

**AUTOMOTIVE CRASHES**

- Truck and Car Collisions
- Crush Analysis with Defects
- Biomechanics of Injury
- Vehicle Speed Calculation
- Analysis for Stopping Distance
- Coefficient of friction
- Vehicle Across Yellow Line
- Headlights On or Off
- Adequate Brakes Analysis
- Spring Failure Rollover
- Rollover Crush

**COMPONENT FAILURES**

- Air Bag
- Seat Belt Failure
- Night Visibility
- Brake Failure
- Door Latch Failure
- Shock and Suspension Failure
- Wheel Rim Bolting Failure
- Weld Defects
- Trailer Hitch
- Safety Chains
- Fuel Gas Tank

**MACHINE DESIGN**

- Conveyor Injures
- Roll Press
- Weld Failures
- Herrington Rods Spinal Prosthesis
- Carbon Monoxide Poison
- Boiler Overheat Failure

**MANUFACTURING PROCESSES**

- Conveyor Safety Access
- Pressure Vessel Failures
- Fuel Safety Valve Failure
- Bulk Powder Storage Tank Collapse
- Air Tank Explosion
- Water Tank Explosion

**MARINE AND WATER CRAFT**

- Marine Winch Failure
- Boat Throttle Failure
- Barge Deck Latch Failure
- Boat Carbon Monoxide Px
- Derrick Barge Crane Failure
- Fire Systems Valve Failure
- Manbasket Deck Impact
- Barge Crane Collapse
- Outboard RR Tie Strike

**PROPERTY LOSS, INJURY MECHANICS AND CONSTRUCTION STANDARDS**

- Fire Caused by Gas Utility Service
- Electric Generator Fire
- Building codes for Stairs and Ramps
- Fire Proofing Products Application
- Hydraulic Oil Fire
- Coefficient of Friction of Floor Surfaces
- Wind Damage of Building and Signs
- Defective Design and Construction
- Code Compliance
- Ladder Collapse

## **Cranes, Components and Lifting Equipment**

Forensic engineering and accident reconstruction of crane and lifting equipment have been provided for more than 15 years and includes machines with lifting capacity to 8,800,000 lbs (4400 tons) and elevations to 347 feet.

- Tower Crane ó Disassembly ó failure
- Hydraulic Crane Collapse ó Outriggers
- Jib Crane Collapse ó Movement overload
- Truck ó Hydraulic Cranes ó Boom Overload
- Wire Rope Failure ó Wrong Service Application
- Power Line Contact ó Load Geometry ó Movement
- Lift Procedures ó Rigging Failure
- Lattice Boom Failure ó Detective Weld Repair
- Derrick Barge ó Unstable ó Swinging Load
- Man Basket Lift ó Drop to Boat Deck
- Forklift Misuse ó Impact with Wall
- Forklift Misuse ó Training and Service Failure
- Scissor Lift Collapse ó External Force
- Hook Roller Failure ó Collapse of Drag Line
- Barge/Deck Crane collapse ó Hook Roller failure
- Extending Fork Lift/Crane - Entrapment

## **Supervision of Crane Repairs**

Supervision of the design, manufacturing and repair work for heavy machinery is also included in the following service experience and includes lift capacities to 1,100,000 lbs (550 tons).

- Lattice Boom Weld Repairs
  - Tower Cranes
  - Booms and Jibs
- Hydraulic Boom Repairs
  - End Sheave Sections
  - Boom Sections
  - Rotating Turret
- Hydraulic Back Hoe Digger
  - Modified to dig ó 100 feet deep pitch for sealing barrier

## **Resume Fire, Arson and Explosion Cases**

### **Explosions and fire**

Air Tank Explosion - injuries from impact and negligent care  
Water Tank Explosion - defective weld repair  
Reactor pressure vessel flash fire - equipment damage test for conformance  
Pressure cooker explosion - analysis and cause

### **Equipment fires**

Truck hydraulic hose failure and fire - during repair  
Home gas fired electric generator fire - cause and analysis  
Vehicle under ride of fuel hauler - valve failure cause of fire and death  
Boiler overheat - wood fire from pipe contact  
Shipboard fire water safety valve failure - design analysis

### **Vehicle fires**

Toyota - fuel tank fire from fuel neck connection design  
Motor home - brake explosion compartment failure and resulting fire  
Mercedes Benz - fuel line to injector leak failure and fire  
Vehicle fire from impact - addict driver and accident reconstruction

### **Home fires**

Home stove grease fire - negligent care  
Natural gas feed line failure - analysis and cause of home fire  
Arson fire - fuel propellant in home fire  
Cocaine house - fire from open flames  
HVAC fire - from repair service  
Arson of home - eminent domain property fire  
Home electric portable heater fire - analysis and cause  
Chimney wall separation fire - analysis and cause

## **MISCELLANEOUS AUTOMOTIVE AND WATERCRAFT WORK EXPERIENCE**

Jack sparks has more than three years experience working in service stations, fixing flats, changing tires, servicing automobiles and trucks, brake service and repair, universal joints replacement, shock absorber replacement, repair of clutch assemblies and other automotive repair services.

Other experience include the design and manufacture of fiberglass airboats including rebuilding aircraft engines, installing and repair of propellers, fabricating motor stands, control seat stands, rudders and guards, wiring, trailers for hauling. He also has many hours of time operating an airboat in Florida.

**Engineering Staff and Services**  
**Automotive – Equipment – Construction**

<b>Jack W. Sparks</b> <b>Principal Engineer</b>	
<b>Engineering Analysis</b>	
<ul style="list-style-type: none"><li>• Kinematics and Dynamics</li><li>• Biomechanics of Injury</li><li>• Mechanical Equipment Design</li><li>• Structural Load/Stress Analysis</li><li>• Fracture and Fatigue Failures</li><li>• Thermal, Liquid and Gas Systems</li></ul>	
<b>Joe Czech</b> <b>Accident Reconstructionist</b> <ul style="list-style-type: none"><li>• Traffic Collision Reconstruction</li><li>• Computer PC Crash</li><li>• 3D Animations</li><li>• Site and Scene Plans</li><li>• CAD Machine Drawings</li><li>• Working Model</li><li>• Discovery/Trial Support Preparation</li></ul>	<b>Jim Arnold</b> <b>Manufacturing and Construction</b> <ul style="list-style-type: none"><li>• Construction Practices</li><li>• Automotive components</li><li>• Welding and Manufacturing</li><li>• Crane and Lift Machines</li><li>• Modeling and Testing</li></ul>
<b>Wes Sparks - Consultant</b> <b>Accident Reconstructionist</b> <ul style="list-style-type: none"><li>• Computer PC Crash</li><li>• 3D Animation</li><li>• Photo Modeler</li><li>• Time Study</li><li>• Crush Analysis</li></ul>	<b>Jeremy Sparks</b> <b>Accident Reconstructionist</b> <ul style="list-style-type: none"><li>• Traffic Collision Reconstruction</li><li>• Computer PC Crash</li><li>• CAD Drawings</li><li>• Crash Zone Animations</li><li>• Crime Scene Animation</li><li>• Discovery/Trial Support</li></ul>
<b>Pat Melvin</b> <b>Technician</b> <ul style="list-style-type: none"><li>• Media Presentation</li><li>• Trial Preparation</li></ul>	<b>Alan Sparks</b> <b>Quality Control</b> <ul style="list-style-type: none"><li>• ASME Codes and Standards</li><li>• ASME Construction/Repair</li></ul>

**SERVICES – TECHNIQUES – METHODS**

**COMPUTER MODELING METHODS**

- Computer Accident Reconstruction
- Crash and Crush Analysis Using Energy and Momentum
- Structural Stress Using Finite Element Analysis
- ASME Code Methods for Machines and Components
- Photo Modeling

**PHYSICAL MODELING And PRESENTATIONS**

- Scaled CAD Drawings and Layouts
- Video Presentations
- 3D Animation Simulations
- Fracture Failure Analysis
- Working Scale Models
- Real Time and Position Layouts
- Component Testing and Evaluations
- Roadway Friction Tests

## **Accident Reconstruction Engineering Analysis and Simulation**

### **Visual Statement and PC Crash**

Complete automobile, truck and tractor collision analysis and animation in real time, and in 3D with multiple point perspective viewing. Energy analysis including crush, delta V, speeds and multiple vehicle impacts. Pedestrian impacts, with vehicles, motorcycles and bicycle collisions, scene reproduction from photos and scaled Cad drawings.

### **Accident Reconstruction for Windows**

Impact analysis including, crush analysis, positions of rest after impact, coefficients of friction, speed calculations, time studies for perception and reaction. Pedestrian and cyclist throw at impact, vehicle vault, swerve and lane change analysis.

### **Crash Zone**

Accident scene drawings complete 2D & 3D for court presentation.

### **Visual Statement and Crash Zone Animation**

Clip videos in real accident time. Illustrate all aspects of a vehicle accident.

### **Crime Scene and Animations**

Building layouts with people, furniture and other demonstration of actions, movement, lines of sight and shots.

### **Photo modeler**

Software used to determine crush dimensions from photographs for crush analysis and speed determination. Scene photos and parts photos are rendered for 3-D presentation.

### **ATB – Biomechanics**

Simulation software of body movements in vehicle responding from impact and including seat belts and air bag restraints.

### **Working Model**

A mechanical kinematic and dynamic simulating software package used to analyze machines, cranes and lifting equipment involving structures and weight, impact, speed and motion.

### **Vehicle Dynamics**

Roadway dynamics and characteristics of vehicles including weight suspension shock absorbers, geometry positional dynamics and speed.