

**WATSON ENGINEERING CORP.
P.O.Box 820996
Dallas, Texas 75382
214-503-7450**

CURRICULUM VITAE OF HAL WATSON, JR., Ph.D., P.E.

INTRODUCTION

Hal Watson, Jr. has been a tenured professor of mechanical engineering at Southern Methodist University for over 35 years where he has taught undergraduate and graduate engineering courses in such subjects as strength of engineering materials, stress analysis, dynamics, dynamic mechanical measurements, CAD and mechanical product design. During that time he has consulted with government agencies in engineering research and with private industry in product design and analysis.

He began working on forensic engineering cases in 1969 and has consulted in hundreds of cases related to mechanical engineering which have had the potential for litigation and has testified about four hundred times in deposition and about seventy five times in state and federal courts. Many of the cases have involved mishaps, usually involving mechanical equipment and human beings in which issues of commercial loss, personal injury or wrongful death have arisen.

Many of the mishaps have involved land vehicles on roadways or machines on the job site. Others have occurred in the home or in public places. Certain types of mishaps have required additional specialized courses, conferences, testing and certification.

PRESENT EMPLOYMENT:

Mechanical Engineering Professor Emeritus
School of Engineering and Applied Science
Southern Methodist University
Dallas, Texas 75275

also

Licensed Mechanical Engineer and Chief Engineer
Watson Engineering Corp.
P. O. Box 820996
Dallas, Texas 75382-0996
tel: (214) 503-7450
fax: (214) 503-7450
email: halprof39@aol.com

MAILING ADDRESSES:

Letters:

Watson Engineering Company
P. O. Box 820996
Dallas, Texas 75382-0996

Parcels and Overnight Deliveries:

Watson Engineering Company
9629 Spring Branch Ste. B
Dallas, TX 75238

Couriers and Physical Office:

Watson Engineering Company
9629 Spring Branch Ste. B
Dallas, Texas 75238

EDUCATION:

Ph.D. Engineering Mechanics, University of Texas, 1965-67
M.S. Engineering Mechanics, University of Texas, 1963-65
A.B. Columbia College, Columbia University, New York, 1958-62
H.S. Diploma, Henderson High School, Rusk County, Henderson, Texas 1958

EXPERIENCE:

Watson Engineering Co., Head, forensic engineering, 1976-present
Accident Reconstruction Laboratory Inc. 1975-1990. Contract Consulting Engineer.
Southern Methodist University, Mechanical Engineering Department,
Associate Professor, January 1970 - 2001. Tenured 1973.
Professor Emeritus 2001-present.
United States Environmental Protection Agency, Region VI, Noise
Consultant, 1973-76.
National University of Tucuman, Argentina, Visiting Professor of
Civil Engineering, July 1972.
Federal University of Rio Grande do Sul, Brazil, Professor of
Mechanics of Solids and Structures, May 1972-January 1973.
Southern Methodist University, Solid Mechanics Center, Associate
Professor, 1970-72.
Southern Methodist University, Solid Mechanics Center, Assistant
Professor, 1967-70.
University of Texas, Structural Mechanics Research Laboratory, Research
Engineer, 1964-67.
University of Texas, Department of Engineering Mechanics, Teaching
Assistant, 1963-64.
Military Physics Research Laboratory, Research Scientist, Austin, Texas, Summer
1963.
New York Telephone Company, Management Trainee, Brooklyn, New York, Summer 1962.

FIELDS OF INTEREST:

Forensic engineering as related to: intellectual property issues involving electrical and mechanical products, safety engineering, operation of heavy industrial equipment, accident causation, mechanical and electro-mechanical design and design safety, mechanical measurements and control, vehicle dynamics, and vehicle accident investigation and reconstruction. Has given deposition testimony in over 400 cases and courtroom testimony over seventy five times.

PROFESSIONAL REGISTRATION and CERTIFICATION:

Mechanical Engineering, State of Texas, P.E. No. 40468, 1976
A.C.T.A.R. certification #1177 in Motor Vehicle Traffic Accident Reconstruction.
(2001-2006)

GRANTS AND CONTRACTS:

N.S.F. - Research Initiation Grant. P.I.	1968
O.N.R. - Themis Grant at Stat, Dept. Assoc, Inv.	1968-1971
N.A.S.A.- Multidisciplinary Grant. P.I.	1972
E.P.A. - Research Contract, P.I. Sept.	1976-1977
Dallas Foundation - Equipment in Robotics	1983-1984
D.O.D. - Research in Robotics	1986-1987
N.S.F. - Univ-Ind, Coop. in Robotics Education	1987-1990

PROFESSIONAL SOCIETIES, HONORS & AWARDS:

Accreditation Commission for Traffic Accident
Reconstruction (ACTAR) (#1177), 2001-2006.

American Society for Metals, International (ASM)

American Society for Testing Materials (ASTM)

Technical Committees

F24 - Amusement Rides and Devices

F24.10 - Test Methods

F24.20 - Specifications and Terminology

F24.24 - Design and Manufacture

F24.30 - Maintenance and Inspection

F24.40 - Operations

F24.60 - Special Rides/Attractions

F24.70 - Water Related Amusement Rides and Devices

American Welding Society (AWS)

American Society of Mechanical Engineers (ASME)

Paper Reviewer for Journal of Vibration,
Systems and Control

American Society of Safety Engineers (ASSE)

Society of Automotive Engineers (SAE)

Society of Manufacturing Engineers (SME)

Society of Plastics Engineers (SPE) DSM95063726

National Association of Fire Investigators (NASI)

American Society of Plumbing Engineers (ASPE)

Accident Reconstruction Communications Network-Platinum Member

Institute of Timber Construction - member

Tau Beta Pi - engineering honor society

Sigma Xi - scientific honor society

U.S. E.P.A. Bronze Medal Award-for commendable service - U.S. Environmental
Protection Agency, January 1975

Outstanding Professor at Southern Methodist University
1983 (one of ten)

Most Popular Professor in CME-1985-86 & 1986-87

FAC, Maguire Center for Ethics & Public Responsibility, SMU

Distinguished Alumni Award 2001, Henderson High School Alumni Assoc.

ENGINEERING COURSES TAUGHT:

Undergraduate

Statics

Dynamics

Strength of Materials

Elements of Machine Design

Computer-Aided Design (CAD)

Mechanical Vibrations

Mechanical Measurements Lab

Wind Energy

Vehicle Dynamics

Mechanical Controls

Robotics

Machines and Society

Graduate & Senior

Advanced Strength of Materials

Elasticity

Theory of Plates

Composite Materials

Random Vibrations

Stress Wave Propagation

Engineering Acoustics

Environmental Noise Control

Experimental Mechanics

Viscoelasticity

Industrial Noise Control

Ethical Decisionmaking in Science,
Engineering and Technology

PROFESSIONAL DEVELOPMENT:

"WREX 2000". Five day international conference and class on accident investigation and reconstruction with live demonstration collisions of cars, trucks and motorcycles. Sept. 24-29, 2000. Texas A&M University, College Station, Texas.

"Injuries, Anatomy, Biomechanics and Federal Regulation". Society of Automotive Engineers professional seminar. August 4-8 1997, San Diego, CA. Injury criteria from automobile collisions, Federal motor vehicle safety standards.

"Low Speed Collisions- Technical Workshop" . Society of Automotive Engineers 20 hour workshop. August 1996. Vancouver, B.C., Canada. Crash dynamics, biomechanics, and full scale demonstration low speed collisions of automobiles and occupants.

"Computer-Aided Vehicle Accident Reconstruction", USC, 1978. An advanced course in accident investigation, photogrammetry, and the use of CRASH3 and SMAC in determination of the reconstruction of vehicle accidents.

"Fundamentals of Fire and Explosion Hazards Evaluation", AICHE, Houston TX, 1980.

"Human Factors Engineering". One semester college course in engineering psychology. Southern Methodist University. 1976.

"Engineering and the Law". One semester law course. Southern Methodist University. 1974.

"Engineering Ethics". PDHEngineer.Com on-line course. Exam and Certificate.

"Overcurrent Protection". PDHEngineer.Com on-line course. Exam & Certificate.

"Controlling Electrical Hazards". PDHEngineer.Com on-line course. Exam and Certificate.

"International Plumbing Code: A Guide for Use and Adoption", PDHEngineer. Com. Exam and Certificate.

"Quality Management", online continuing educational course. www. RedVector.com, exam and certificate.

"Workplace Safety: How to Avoid Hazards." www. RedVector.com Certificate, exam and certificate.

"Presentation Skills for Managers - BS1001" www.pdhenhineer.com, exam and certificate.

"Introduction to the U.S. Patent System - L-2003", www.pdhenhineer.com, exam and certificate.

"2006 ARC-CSI Crash Conference, June 5-8, 2006. Las Vegas, NV.
21 ACTAR CEUs

"Amusement Industry Manufacturers and Suppliers International" (AIMS)
Module Title: ASTM F 770-93 Standard Practice for Operations Procedures for
Amusement Rides and Devices for AIMS; 3.0 PDU
Module Number A3201

Module Title: ASTM F 846-92 Standard Guide for Testing Performance of
Amusement Rides and Devices for AIMS; 3.0 PDU
Module Number A3202

American Society of Safety Engineers

Technical Audio Conference entitled "Addressing the
Issue of Slip Resistance and the Safety of

"Why Standards Matter" by Pamela Suetz, B.S. www.pdhcenter.com online course for engineers. 3 PDH.

"Metal Deterioration" by Matthew Stuart, P.E. www.pdhcenter.com online course for engineers. 2PDH.

"Metal Corrosion-Causes and Types", by John Poullain, P.E., www.pdhcenter.com online course for engineers. 2PDH.

"Brittle Fracture of Materials", by DOE staff, www.pdhcenter.com an online course for engineers. 2PDH.

"Finding the Root Cause", a short course in statistical inquiry. www.pdhengineer.com. online course. 4 PDH.

CONSULTATIONS:

Dresser Industries, Intercontinental Manufacturing Co., Monocab Inc., Saturn Industries, H.R. Reid Associates, U.S. Environmental Protection Agency, Accident Reconstruction Laboratory, Environmental Consultants Inc., Loxem Inc., General Portland Cement, Woodward Inc., JMC Corporation, Banyan Corporation, Nu-Disk Inc., Long Metals Inc., Registry Hotel Corporation, Southwest Metals Inc., Unitron Inc., ICARE (Robert Bass), City of Highland Park, Langston Companies, Inc.

MECHANICAL PRODUCTS DESIGNED:

<u>Company</u>	<u>Product Designed</u>
Monocab, Inc.	Split-rim wheel for foam-filled high pressure tire used on an overhead monorail people mover.
Saturn Electronics	An electromechanical pulsing intervalometer for helicopter rocket launchers.
H.R. Reid Associates	A vacuum-controlled PVC valve for air pollution control system for automobiles. Inventor, U.S. Patent No. 3,550,570. Assigned.
JMC Corporation	A downhole mud driven drilling turbine for oil field operation.
Banyan Corporation	Disc airbrake system for heavy trucks & trailers.
Southwest Metals, Inc.	Steel structural stud design and analysis.
Dresser Industries	Unipacker design. Pump analysis and design
Unitron, Inc.	Noise control design for aircraft power converter.

PUBLICATIONS and PRESENTATIONS:

1. "Determination of the Dynamic Stress Strain Characteristics of Materials at Elevated Temperatures", (with E.A. Ripperger), *Experimental Mechanics*, Vol 9, No. 7, July 1969, pp. 289-295.
2. "Experimental Determination of the Dynamic Stress-Strain Characteristics of Pure Iron", *International Journal of Solids and Structures*, Vol. 6, pp. 1157-1172, Aug. 1970.
3. "An Experimental Investigation of Pulse Propagation in Neoprene Filaments", (with H.H. Calvit). Presented at Spring 1971 meeting of Society for Experimental Stress Analysis.

- Experimental Mechanics*, Vol. 12, No.7, July 1972, pp. 297-304.
4. "Gauge Length Errors in the Resolution of Dispersive Stress Waves", presented at Spring 1972 meeting, Society for Experimental Stress Analysis. *Experimental Mechanics*, Vol. 12, No.8, August 1972, pp. 352-359.
 5. "Preparation of Long Waves in an Alternately Layered Viscoelastic Composites", presented at III International Congress on Experimental Mechanics, Los Angeles, May 1973.
 6. "Strain-Rate Effects and Plastic Wave Propagation in Aluminum Rods", (with E.A. Ripperger), *Proc. Fifth U.S. Nat. Cong. Appl. Mech.*, Proc. Fifth U.S. Nat. Cong. Appl. Mech., ASME 1966.
 7. "The Relationship Between the Constitutive Equations and One-Dimensional Wave Propagation", (with E.A. Ripperger), *Proc. of Symposium on the Mechanical Behavior of Materials Under Dynamic Loads*, Springer-Verlag, 1967.
 8. "Working with the Technical Witness", oral report presented to Dallas Trial Lawyers Association Conference on Products Liability, December 1978.
 9. "Computer-Aided Accident Reconstruction", report presented to Dallas Trial Lawyers Association, April 1979.
 10. "Unmanned Noise Source Identification via Analog Tape Micro-sampling", presented to 98th Meeting: Acoustical Society of America, Salt Lake City, Utah, November 1979. *JASA Suppl.* 1, Vol. 66, Fall 1979.
 11. "The Witnesschair: Testing Ground or Fertile Ground for Unethical Engineering Advocacy", oral report presented to National Conference on Engineering Ethics, Troy, New York, June 1980.
 12. "Direct and Cross Examination of an Expert Witness - A Demonstration", Second Annual Symposium on Products Liability - The Trial of a Products Liability Case, March 1981, Dallas.
 13. "Minisample Noise Level Survey of CBC of Denver", National Noise and Vibration Control Conference and Exhibition, Chicago, April 1981.
 14. "Prediction of Sidewalk Noise Levels Caused by Traffic in an Urban Central Business District", *Proceedings of the International Conference on Noise Control Engineering "83"*, Edinburgh, Scotland, July 1983.
 15. "Paper Honeycomb Crushing Strength and Energy Dissipation", Research Report, Structural Mechanics Research Laboratory, University of Texas, 1964.
 16. "Ground Impact Shock Mitigation of M151 Utility Vehicle (Jeep)", Research Report, Structural Mechanics Research Laboratory, University of Texas, 1964.
 17. "The Effects of Strain Rate and Temperature on the Stress-Strain Characteristics of Copper and Iron", Technical Report (dissertation), Engineering Mechanics Research Laboratory, University of Texas, 1967.
 18. "Dynamic Testing and Wave Propagation in a Strain Rate Sensitive Material", Themis Report #21, Southern Methodist University.
 19. "Wave Propagation in an Inhomogeneous Medium", Themis Report #50, Southern Methodist University, 1969.
 20. "An Approximate Fourier Integral Transform Method for Analysis of Wave Propagation Data", Themis Report #73, Southern Methodist University, 1970.

21. "An Environmental Noise Assessment of Waco, Texas", (with C. Riddell and G Putnicki), U.S. Environmental Protection Agency, March, 1974.
22. "An Environmental Noise Assessment of Grand Prairie, Texas", U.S. Environmental Protection Agency, December 1974.
23. "Environmental Noise Monitoring at Three Sites in Irving, Texas", U.S. Environmental Protection Agency, Region VI, Dallas, Texas, February, 1975.
24. "Accuracy of Analog Tape Microsampling of Environmental Noise", U.S. Environmental Protection Agency, January, 1978.
25. "Drywall and Structural Stud Systems - Technical Data Handbook", published by Southwest Metals, Inc., Dallas, Texas, January 1983.
26. "Noise Reduction of GFC-40 Power Converter", for Unitron, Inc., 1986.
27. "Preparing and Trying the Automobile Collision Case Institute Series, The State Bar of Texas, faculty member, September 1988.
28. "Noise Contour Analysis of Dallas Love Field", for City of Highland Park, 1990.
29. "Simulation of Low-Speed Vehicle Impacts", submitted to Accident Reconstruction Journal, July 1997.
30. "Low Impact N-Interactive - The Low Impact Encyclopedia designed for Windows 95". Multimedia CD-ROM published by N-Sight Studios, Inc. Lewisville, TX September 15, 1997.

FORENSIC MECHANICAL ENGINEERING CASE STUDIES:

The following list of engineering studies represents work performed for clients in cases having the potential for litigation over a period of thirty six years. Not all of the studies resulted in testimony or written reports.

I. Accident Reconstruction and Investigation

Motor Vehicle:

Head-on, side, & rearend collisions, rollovers, impacts, speed analysis, Crash Data Retrieval, time and distance,

line-of-sight, highway design, guard fence, signing, visibility, visual acuity, stopping distance, lane changing, braking and steering, maintenance issues, critical curve speed, reaction time and distance, collision avoidance, photo analysis, mapping and surveying, immovable objects, breakaway obstacles, ejection, seatbelt forces, child safety seats, airbag deployment, low speed rear-end collisions, speed from damage, computer-aided accident reconstruction. Vehicle dynamics of articulated vehicles (trucks or cars and trailers). Scale modeling of scenes and vehicles.

Railroad:

Time and distance, visual and audible warnings, acoustical analysis, train braking, signing, train speed, collision analysis, car/train collisions, train/pedestrian collisions, sight triangle.

Pedestrian:

Impact speed, lookout, night visibility, impact dynamics and forces of injury, time and distance, slip and fall, trip and fall, visual acuity.

Construction Site and Workplace:

Falls, ladders, tools, railings, floor openings, heavy equipment, material hoists, manlifts and work platforms, electrocution, crane, hydraulic cylinders, skid-steer loaders, power fork lift trucks, pallet trucks, scaffolding, repelling equipment, pneumatic nail guns, power presses, press brakes, falls, ladders, bulldozers, backhoes, pneumatic impact wrench, H2S spill, Carbon Monoxide inhalation, installation falling of manufactured housing, powder actuated tools, rock crusher, cardboard crusher/bailer, road building equipment, concrete mixing equipment, overhead doors.

Home and Public Premises:

Consumer products, slips, trips and falls, hand and power tools, step ladders, extension ladders, microwave oven, exploding soft drink bottle, LPG gas regulation, hot water burns, lawnmower, elevator, exploding beer keg, jack stand, bicycle, mechanical garage door, swimming pool, chair failure, pool filter explosion, electric blanket, hot water heater emissions, mechanical fire hazards, automatic door interferences, falling merchandise, golf club impalement.

Farm:

Conveyor, thresher, tractor, front-end loader, gooseneck trailer, trailer hitch release.

II. Accidents Involving Mechanical Products

Automotive components:

Steering, tires, wheels, structure, seatbelts, doors and doorlocks, transmission, brakes, lights,

fuel tank, seats, body integrity, battery, airbag, rear axle, suspension, springs, wheels, stuck throttle, jump out of gear, automatic parking brake release, water pump-fan failure, ABS brake failure.

Motorcycle and pedacycle:

Brakes, electrical system, sissie bar, ATV stability, 3 & 4 wheel ATV, bicycle, rear wheel wobble, loss of wheel during operation, collision with other vehicles, speed analysis from damage, light bulb analysis, minibike front fork.

Motorboats:

Steering, automatic kill switch, engine size, stability, propeller guard, personal watercraft collisions.

Tractor/Trailer:

Rollover, braking and steering, air brakes, kingpin, steering, load shifts, vibration, power steering, suspension, cab locks, hydraulic booster brake, electric booster brake, loss of liquid load during collision, trailer visibility at night.

Forklifts:

Tipover, falling objects, runaway, instability, braking and steering, stall on ramps, attachments, warnings and instructions, stability, interlocks, maintenance problems, controls, seatbelts off dock plunge, collision with fixed objects.

Hoists & Cranes:

Dropped loads, controls, two-blocking, electrocution, safety equipment, warnings and instructions, dropped jib, hoist gears and bearings, falling sheave block guard, scissor lift falls.

Machines:

Presses, saws, crushers, conveyors (all types), harvesters, nip point guarding, brake, welders, robots, mold, grinder, nailer, wheel alignment machine, hoists, valves, drilling rigs, cable layer, hydraulic rams, shredder, meat tenderizer, mowers, brushhog, backhoe, tractor, impact wrench, water reclamation, ribbon cutter, aluminum die casting, pitching machine, laminating machine, palletizer, street sweeper. Portable powered sewer auger.

Miscellaneous:

Jack stand, hydraulic jack, elevator, lawnmower, soft drink bottle, LPG gas regulator, beer keg, pneumatic nail gun, medical electrical stimulator, electric impact wrench, deep fat fryer, chair failure, lighter, scaffolding, inflatable carnival slide, battery powered cable winch, junior golf club shaft.

Electrical:

Lighting, wiring & fixtures, electrocution, kill switch, improper grounding, GFCI, high voltage proximity, electric blanket, contact with electric power lines.

III. Intellectual Property (Non-accident cases)

Patent Infringement:

Rodeo training device	Rumble Strip Cutter
Rotary file cabinet	Golf Club design
Fertilizer mixer	Interlocking flooring
Mini flashlight (MiniMag Light)	Automailing equipment
Rechargeable flashlight	Automotive Side Airbags
Electronic fuel pump	
Electronic chip carrier	
Plastic throwing disks (frisbees)	
Bulk cargo bags	
Dock levelers	
Truck IC bar locks	
Flexible flashlight	
Sheet metal leveler	
Thermoelectric cooler	
Plastic dog house design	
Modular aircraft window & shade	

Trade Secret:

Water applicator for printing press.

Trade Dress:

Function v. appearance of mini flashlight.

END

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