



**ENGINEERING  
PIPING ANALYSIS INCORPORATED™**

**D. E. HANSEN, M. E. , P.E.**

**PRESIDENT**

Mr. Hansen specializes in Computational Fluid Dynamics, Finite Element Analysis for stresses and heat transfer, generalized stress, flow and dynamic analyses for piping systems, engines, turbo machinery, pumps, vessels, and related structures. He is a mechanical engineer with graduate work in physics and engineering mechanics.

**EDUCATION:** Mechanical Engineering and Engineering Mechanics

University of Florida

*Louisiana Tech University*

Louisiana State University

**EXPERIENCE:** Mr. Hansen, a registered professional engineer, taught in the Engineering Department at LSU. He has worked as mechanical engineer for Tenneco, and as mechanical engineer and project co-ordinator in charge of design, project engineering, and construction activities for The Ethyl Corporation.

As president and chief mechanical engineer of Piping Analysis Incorporated since 1972, Mr. Hansen has authored several large-scale computer programs to solve piping stress analysis and flow problems, and structural and vessel problems. These programs provide optimization of mechanical systems to produce quality solutions.

PIPING ANALYSIS INCORPORATED provides competent engineering assistance to engineering, legal, and maintenance organizations throughout the world through the use of unique and comprehensive computer programs and methods of solution. Successful solutions are produced for difficult problems with rotating machines such as gas expanders, turbines, engines, compressors, pumps, and fixed equipment such as heat exchangers and vessels. The results of PAI's work are presently operating throughout the Americas, Europe, and Africa.

**PUBLICATIONS:** Mr. Hansen has been invited to speak before national meetings of AIChE and other engineering societies. His papers have been featured in several technical publications.

**FORENSIC ANALYSIS AND EXPERT WITNESS:** Mr. Hansen has produced calculations and opinions, and testimony for such cases as the Nitram - GHH Gas Expander Failure, Volks Constructors vs. Strestec Engineering, Illinois Central Rail Marine Terminal Crane Failure, Borden Plastics Tank Failure, Kaiser Aluminum Flash Tank System Explosion, CF Industries Mole Sieve Explosion, Kaiser Group Holding vs. Colt (Canada), and Studsvik vs. Metric-Duke Joint Venture Radiological Waste Facility. All of the above cases involved the use of Finite Element analysis, Computational Fluid Dynamics, hydro-dynamics, pneumatic surge analysis, piping stress and flexibility analysis, ASME B31.1 and B31.3 Codes for pressure piping, ASME Section VIII - Divisions 1 and 2 codes for pressure vessels.

## GERALD “JERRY” D. DAVIS

### EDUCATION-

M.S.- Chemical Engineering '75, Mississippi State University  
Minor- Environmental Engineering, Mississippi State University  
BS- Chemical Engineering '73, Mississippi State University

### REGISTRATION/ MEMBERSHIPS

Registered Professional Engineer- Mississippi  
Member of AIChE Safety & Health Division Ammonia Safety Subcommittee

### AREAS OF EXPERIENCE

|                   |              |                            |
|-------------------|--------------|----------------------------|
| Process design    | Plant safety | OSHA PSM 1910.119          |
| Plant reliability | NOx control  | Ammonia, nitric acid, urea |
| Process control   | PHA reviews  | PSV scenario/ sizing       |
| Plant management  | ESD systems  | Rotating equipment         |

### EXPERIENCE

#### **Expert Witness**

Testified in the Studsvik vs. Metric-Duke Joint Venture case representing the owner and testifying as to the steps required to successfully develop, design and build a production facility.

#### **General**

During my career, I have worked in research, pilot plants, process design engineering, chemical plant safety systems design, incident investigations, chemical plant production management, management of all aspects of chemical complexes and as an expert witness. During my 25 year career, I have held titles of: Project Engineer, Development Engineer, Manager of Research and Development, Production Superintendent, Process Engineer, Senior Process Engineer, Technical and Environmental Manager, Production Manager, Senior Process Consultant, Process Engineering Department Manager and Plant Manager.

#### **Overview**

After receiving a masters degree in chemical engineering in 1975, I worked as a consultant to recommend and design process improvements for a variety of industries. From 1981 through 1995, I worked in the process engineering design area in the nitrogen fertilizer industry developing process modifications to enhance the cost competitiveness of the chemical plants. Five major revamps I designed were installed. In this 14 years segment I had responsibilities initially as a process design engineer with no management

responsibilities to later, managing a process design engineering with layers of management responsibility.

In 1995, I worked as a senior process consultant representing an insurance company's interest on the Terra Industries Port Neal case involving a major chemical plant explosion. I worked as a consulting engineer with responsibility of starting, growing and managing a process engineering department. This effort developed a non-existing department to about 30 chemical engineers. Process design relationships were developed with such companies as Union Carbide and Exxon. This work involved developing process design engineering packages for cost estimates, scheduling, economic justification and management approval.

In 1997, I joined a company to build and manage a grass roots chemical plant. This plant was built under a Design/Build Agreement with an engineering company. Construction of the plant took about 18 months; the plant is now operating successfully.

## Dr. Claude R. Mount, PE

### COMPETENCIES

- Familiar with a wide range of engineering systems, equipment, standards, and procedures.
- Knowledgeable regarding material properties, performance, selection, and testing.
- Expert in performing failure analyses to discover *Why Something Broke?*
- Credible and effective when explaining cause-and-effect relationships in down-to-earth terms.
- Proficient at training individuals in unfamiliar, complex fields of study.

### CHARACTERISTICS

- Highly motivated, reliable, confident, and ingrained with professional standards.
- Communication and motivational skills for effective interaction to achieve positive results.
- Organized to meet deadlines and manage numerous projects simultaneously.
- Committed to life-long learning and sharing that knowledge.

### EDUCATION

Doctor of Philosophy - Engineering Science

December, 2000

Major: Industrial Engineering – Minor: Computer Science

Dissertation: An Intelligent Failure Analysis System (aIFAS)

Louisiana State University    Baton Rouge, LA

Master of Science - Mechanical Engineering

August, 1977

Research in automatic controls using computerized numerical methods, combining mechanical, chemical, and electrical engineering disciplines.

Louisiana State University    Baton Rouge, LA

Bachelor of Science - Physics

May, 1971

Louisiana State University    Baton Rouge, LA

CERTIFICATION: Registered Professional Engineer – Metallurgy (LA #23321, 1989)

MILITARY: Served in the Armor Branch of the United States Army from 1973 to 1976.  
Honorably discharged from service with the rank of Captain.

PERSONAL: Born February 3, 1948 in Parkersburg, West Virginia, United States of America.

Married with four children and three grandchildren.

*Honoring God by serving others.*

## RECENT EXPERIENCE

Engineering Consultant 1997 – Present

Claude Ray Mount, inc., Jackson, LA

- Investigate failures to identify the most-likely cause, or conduct in depth root-cause analysis.
- Supply information about material performance, or assist in the selection process.
- Review plans and procedures, or offer objective evaluation of concepts and test results.
- Assess technical issues of litigation, or offer expert testimony in cause-and-effect relationships.

Assistant Professor Fall 2001

University of Louisiana – Lafayette, Lafayette, LA

- Faculty position in the Industrial Technology department.
- Taught Introductory Graphics w/CAD and Basic Electronics.

Program Coordinator 1998 – 2001

Baton Rouge Community College, Baton Rouge, LA

- Oversaw the Process Technology (PTEC) program to train entry-level process operators.
- Developed curriculum for 11 courses: industrial instrumentation, automatic controls, plant equipment, internship, fluids dynamics/hydraulics, safety-health-environment, unit operations, PTEC paradigms, quality management/statistical process control, and a capstone project.
- Participated in the work of the Gulf Coast Process Technology Alliance for program enhancement, standardization, and promotion.
- Interacted with an industry advisory committee to develop training resources and to insure that appropriate training was being provided the program graduates.
- Organized a course scheduling plan to accommodate incumbent workers (existing operators) wishing to pursue the PTEC program.

- Taught 34 sections, averaging 15 students per class, in 9 of the PTEC program courses.
- Recipient of the 2001 NISOD Excellence Award for outstanding contributions to teaching and learning. (NISOD – National Institute for Staff and Organizational Development)

Chief-Executive-Officer

1995 - 1997

Scientific Testing Laboratories, inc., Baton Rouge, LA

- Overall management of a multi-discipline, engineering-based service company.
- Modernized equipment, improved operating procedures, streamlined workforce by 60%, and increased productivity by 300%.
- Created a computerized project tracking system as a customer relation's management tool that improved throughput from 5 weeks to less than 2 weeks.
- Transitioned from manual to computerized accounting and instituted procedures that reduced accounts receivable aging from over 90 days to less than 40 days.
- Initiated a marketing program that combined conventional/electronic mail, telemarketing, and personal contact. Within 6 months, the effort was generating 5 new client accounts per month.

Technical Services Director

1985 - 1995

Scientific Testing Laboratories, inc., Baton Rouge, LA

- Conducted failure analyses for industry, government, and business.
- Responsible for the selection, installation, operator training, and maintenance of spectrometers, electron/optical microscopes, instruments for chemical testing, nondestructive inspection gear, mechanical testing devices, machine shop tooling, and computer support equipment.
- Directed microanalysis studies of metallic, inorganic and organic materials.
- Managed routine and specialty materials testing activities.
- Supervised welding-related testing of welders, procedures, and experimental methods.

## EARLIER WORK

Engineer Technician

1978 – 1985

- Carried out mechanical testing of materials.
- Supervised welder performance and procedure qualification testing.
- Designed and performed corrosion testing of materials.
- Performed laboratory and in-the-field metallurgical examinations of materials.
- Conducted failure analyses of components from industry and business.

Operations Research / Systems Analyst

1973 - 1976

- Studied the impact of equipment and doctrine on military effectiveness.
- Developed computerized simulation tools to support those research efforts.
- Modeled military convoy movement to simulate rate of movement and maintenance demands.

- Modeled rotary wing airframes to determine mission range/time-on-station based upon weather, ordinance configuration, cargo, and fuel onboard.
- Involved in early investigations of the Armored Reconnaissance Scout Vehicle (ARSV) that became the High Mobility Multipurpose Wheeled Vehicle (Humvee).

Graduate Teaching/Research Assistant

1971 – 1973 & 1977 - 1978

- Taught material science, thermodynamics, computer programming, and numerical methods.
- Instructed machine tool operation in a Manufacturing Processes course.
- Developed numerical models for evaluation of weapons systems in prototype military aircraft.

Technician / Machinist / Operator

1967 - 1971

- Assembled, tested and installed data acquisition instrumentation for cosmic ray research.
- Used engine lathes and universal milling machines to produce high precision components from ferrous/nonferrous metals and organic materials.
- Fabricated and setup scientific research equipment for cryogenic and high vacuum projects.
- Operated a compressor/cryostat and maintained a helium liquefaction/recovery system.

## AFFILIATIONS

American Welding Society – *Past Section Chairman*

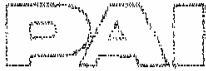
ASM International (American Society for Metals) – *Section Charter Member & Past Chairman*

American Society for Mechanical Engineers

American Standards for Testing Materials

National Association of Corrosion Engineers

Sigma Pi Sigma (Honorary Physics Society)



**PIPING ANALYSIS INCORPORATED™**

**D. T. WATSON, PE**

**PRINCIPLE CIVIL/STRUCTURAL ENGINEER**

**EDUCATION:** BS, 1981, Louisiana State University  
AD, 1989, Southwest State Technical Institute

**REGISTRATIONS:** Registered Professional Engineer - Louisiana, Florida, Alabama  
California, CE, Arkansas, Mississippi and Virgin Islands

**AFFILIATIONS:** Member, American Society of Civil Engineers  
Member, Structural Engineering Institute  
Member, American Institute of Steel Construction  
Member, American Concrete Institute  
Member, Society of American Military Engineers  
Member, Chi Epsilon Academic Society

Offering over 30 years of experience providing engineering, design and program management solutions in a variety of responsible positions in the refining, chemical, and national defense areas. Provide competitive advantage through professional leadership and quality management skills to plan, execute and direct all structural, civil and facilities aspects of assigned projects. Discern client needs and desires, support and guide people and manage technology to achieve objectives.

**EXPERIENCE:**

- Solved compressor and foundation system problem for increased capacity. Foundation system located over 30' deep organic soil materials. Dynamic analysis and solution allows 50% increase in production capacity.
- Developed interactive dynamic analysis for rock formation cited 28,000 HP centrifugal compressor and energy absorbing foundation system. Finite element modeled equipment, foundation and drilled shafts. Used time history loading for modal analysis and peak-to-peak amplitude determination.
- Interactive dynamic analysis of a 3,500 HP centrifugal compressor, driver, table top and deep pipe pile foundation system. Compressor and support system are computer modeled and analyzed as a soil-structure-interaction system for select dynamic cases.
- Develop solutions for Los Angeles, California Fluid Catalytic Cracking Unit reactor and facilities. UBC seismic zone 4 analysis. Performed interactive structural analysis of the 3.6 MM pound reactor, 1.5 MM pound reactor structure and 2.3 MM pound foundation system to assist determination of vessel shell thickness due to seismic lateral loading.
- DoE assessments of facilities and structures for natural hazards phenomena wind, tornado, seismic, and flood; manmade hazards of blast loading (15 psi), projectile impact; code and safety compliance. The static and dynamic analyses involve response spectrum analysis of existing reinforced concrete cylindrical and rectangular shaped facilities using finite elements and soil-spring constants for soil-structure interaction evaluation of critical cases.

**FORENSIC:**

Mississippi River Marine Terminal Crane Failure  
Paper Mill Bridge Crane Girder Web Splitting Failures  
Vibrating Rubber Crumb Equipment Induced Structural Concrete and Steel 3<sup>rd</sup> Floor System Failures  
Elevated Centrifugal Compressor Mat Foundation Dynamic Vibration Induced Soil Failure

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