



FOWLER INC.

*METALLURGICAL ANALYSIS
FAILURE ANALYSIS &
EXPERIMENTAL TESTING*

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Gary J. Fowler, Ph.D.

Dr. Gary J. Fowler is a registered professional metallurgical engineer and founder of Fowler, Inc., an engineering consulting firm specializing in metallurgy, materials science, failure analysis and experimental testing. Dr. Fowler received his Ph.D. in 1976 from the University of California, Los Angeles (UCLA) majoring in Metallurgy and Metals Processing with minors in Materials Science and Product Reliability. Research studies for his doctoral dissertation addressed fracture mechanisms in metals, focusing on the effects of metallurgical variables (e.g. microstructure, inclusion content) on crack initiation and crack growth in steel. After receiving his Ph.D., Dr. Fowler pursued his professional career working in the area of metallurgy, materials science and failure analysis. Over the last 40 years, he has analyzed thousands of components and mechanical systems for the purpose of determining the root cause for failure. Dr. Fowler has lectured on a university level at UCLA and the University of Southern California on topics relating to his work including the methodology for analyzing failed components and investigative laboratory techniques. He operates a laboratory facility in Gardena, California for metallurgical analysis and experimental testing.

Specialized Professional Competence

Metallurgy and materials science; fracture modes and mechanical properties of metals; failure analysis of components and mechanical systems; fracture surface analysis; environmentally induced cracking studies; high and low temperature fracture studies; failure analysis and fracture of welded structures; corrosion related studies; influence of metallurgical variables on fracture behavior; failure criteria; fracture mechanics; fatigue life prediction; fatigue analysis and testing; impact studies; experimental mechanical testing; nondestructive testing and evaluation; scanning electron microscopy; energy and wavelength dispersive spectroscopy; microanalysis; methodology for conducting failure analysis and laboratory techniques.

Educational Background

- B.S., Materials Science and Engineering, University of California, Los Angeles, magna cum laude, 1973.
- M.S., Materials Science and Engineering, University of California, Los Angeles, 1973.
Thesis: "Environmental Effects on the Fracture Behavior of Polymethylmethacrylate (PMMA)"
- Ph.D., Metallurgy and Metals Processing, University of California, Los Angeles, 1976.
Dissertation: "The Fatigue and Fracture Behavior of Rail Steels"

Honors and Awards

Department Scholar, School of Engineering and Applied Sciences,
University of California, Los Angeles, 1971-1973.

Department of Transportation Fellow
University of California, Los Angeles, 1972.

Graduated magna cum laude, Bachelor of Science, 1973

Professional Work Experience

Consulting Metallurgical Engineer, 1983-Present
Fowler, Incorporated; Founded 1985.

Faculty (part-time) 1987-1993
Institute of Safety and Systems Management, Safety Science Department,
University of Southern California

Course Coordinator and Lecturer, University of California, Los Angeles, UCLA Extension, 1980-1983

Failure Analyst and Metallurgical Engineer, part time 1972-1976, full time 1976-1983
Failure Analysis Associates

Postgraduate Research Engineer, 1973-1976
University of California, Los Angeles

Consultant, Fall 1975
Association of American Railroads

Research Assistant and Engineer, 1971-73
University of California, Los Angeles

Registered Professional Engineer

Registered Professional Metallurgical Engineer, State of California No. MET1712, since 1978

University Teaching Background

“Gas Turbine Engine Accident Investigation – Material Factors”, Lecturer, Institute of Safety and Systems Management, University of Southern California, 1987-1993.

“Fracture, Fractography and Failure Analysis”, Course Coordinator and Lecturer, University of California, Los Angeles, 1983.

“Failure Analysis, Prevention and Risk Assessment”, Course Coordinator and Lecturer, University of California Extension, Los Angeles, 1982 (with R.A. Westman).

“Techniques for Failure Analysis, Failure Prevention and Risk Assessment”, Course Coordinator and Lecturer, University of California, Los Angeles, 1980 (with R. Nelson).

Professional Memberships

ASM International (formerly American Society for Metals), since 1971
Society of Automotive Engineers (SAE), since 1978.
American Society for Testing and Materials (ASTM), since 1978
American Welding Society (AWS), since 1983.
National Association of Corrosion Engineers (NACE), since 1984
ASTM Committee E-40, "Technical Aspects of Product Liability Litigation", 1982-1991.
ASTM Committee E-30, "Forensic Sciences", 1991-2009.
ASTM Subcommittee E-58, "Forensic Engineering", 2009-present

Publications and Invited Lectures

"Aviation Accident Investigation Methodology", Charles R. Morin Memorial Symposium on Failure Analysis and Prevention, Materials Science and Technology Conference 2009, October 2009

"Alaska Airlines Accident – Wear Rates and Inspection Procedures", Meeting of Independent Metallurgical Engineers of California (IMECA), 2003

"Forensic Investigation of a Refinery Explosion via Experimental and Numerical Analysis", International Conference on Material Engineering, Lecce, Italy, September 1996 (with M. Fournay and L. Kashar).

"Failure Analysis of Gas Turbine Engines", IMECA, 1993.

"The Evaluation of Thermal Damage in Aircraft Structures", IMECA, 1990.

"Twilight Zone – The Helicopter Accident", The Metallurgical Society of AIME, 1987; ASM International, 1988; Northrup University, 1988.

"Fracture Analysis of Gas Turbine Blades", Fracture and Failure Analysis, WESTEC Conference, Los Angeles, 1988.

"Life Prediction Using Fracture Mechanics", University of California, Los Angeles, CA 1986.

"Analysis of Helicopter Component Failures", IMECA, 1986.

"Intergranular Fracture in Engineering Materials", International Symposium for Testing and Failure Analysis, Los Angeles, 1984 (with R. Lund).

Chairperson, Technical Update II, International Symposium for Testing and Failure Analysis, Los Angeles, 1983.

"Prediction of Structural Failure Using the Failure Assessment Diagram", International Symposium for Testing and Failure Analysis, Los Angeles, 1983 (with J.N. Robinson).

“Examination of Induction Airbox Assembly,” Investigation Manual: Aviation, National Transportation Safety Board, 1983.

“Application of the Failure Assessment Diagram in the Analysis of Pressure Vessel Failures”, Fourth National Congress on Pressure Vessel and Piping Technology, ASME, Portland, 1983 (with J.N. Robinson).

“Accident Investigation Methodology Used in a Large Scale Refinery Explosion”, Subcommittee on Storage and Handling of the Operating Practices Committee, American Petroleum Institute, Los Angeles, 1983.

“Manufacturing Procedures and Their Relation to Failure in Landing Gear Components”, International Symposium for Testing and Failure Analysis, San Jose, 1982 (with M. Brown).

Chairperson, Failure Analysis-II, WESTEC Conference, Los Angeles, 1982.

“Mechanical Properties and Fracture”, Continuing Education Institute, Los Angeles, 1981.

“Investigation of Pressure Vessel Failures”, ASME Pressure Vessel and Piping Division, Los Angeles, 1980.

“Failure Analysis of Wire Rope”, Wire Rope Symposium, Denver, 1980 (with R. Lund and D. Cox).

“Application of Fracture Mechanics in Engineering Design”, University of California, Los Angeles, 1980.

“The Influence of Nonmetallic Inclusions on the Threshold Behavior in Fatigue”, Journal of Materials Science and Engineering, 1979, Vol. 39, p. 121.

“Stress Concentration of Nonmetallic Inclusions and its Effect on Fatigue Crack Initiation in Rail Steels”, American Railroad Engineers Association Bulletin, 1978 (with A.S. Tetelman).

“Effect of Grain Boundary Ferrite on Fatigue Crack Propagation in Pearlitic Rail Steels”, American Society for Testing and Materials, Special Technical Publication (STP-644): Rail Steels Developments, Processing and Use, 1978 (with A.S. Tetelman).

“Fatigue in Rail Steels”, Association of American Railroads, Chicago, May and October, 1975.

“Stable Fatigue Crack Growth Above K_{Ic} ”, University of California, Los Angeles, 1975.