

**MICHAEL T. CRONIN, P.E.**  
**Mechanical Engineer**

**SPECIALIZED PROFESSIONAL COMPETENCE**

Analysis of steady-state and transient stress, strain, and temperature fields using finite element and finite difference methods; fatigue and fracture analysis of large steam turbines, generator rotors, jet engine disks, pressure vessels, spacecraft structures, and launch vehicle platforms; risk analysis procedures for use in making run/repair/retire decisions; nondestructive examination using ultrasonic, magnetic particle, and radiographic methods; development of stress intensity factor solutions using finite element methods; and nonlinear stress and heat transfer analysis.

Recent work includes development of fracture control plans for spacecraft and spacecraft systems to be launched with the Space Transportation System (shuttle); fracture mechanics based suitability-for-service analyses of large high pressure steam turbine rotors; development of creep crack growth prediction methodologies and software for use on high temperature Cr-Mo steam lines and pressure vessels; research on the effect of hydrogen on crack growth rates in iron and nickel based superalloys; research on the effects of residual weld stresses on fracture; research on the crack growth threshold behavior for short cracks; development of statistically based weld examination programs; development of high temperature material testing programs for service aged Cr-Mo-V turbine rotor steels; development of an ultrasonic method for measuring the internal oxide scale formed in high temperature Cr-Mo boiler tubing; and the simulation of shock wave propagation in soils due to above ground explosions.

**EDUCATION AND PROFESSIONAL BACKGROUND**

- B.S. (Physics), Illinois Institute of Technology (1974)
- B.S. (Mathematics), Illinois Institute of Technology (1979)
- Member, American Society for Mechanical Engineers
- Member, American Institute of Aeronautics and Astronautics
- Registered Professional Engineer, State of Illinois #062-041413
- Registered Mechanical Engineer, State of California #M026448
- Certified AWS Welding Inspector, No. 97120771

**SELECTED REPORTS, PUBLICATIONS, AND INVITED LECTURES**

*Evaluation of Defects in Stainless Steel Pressure Tubing*, APTECH Report AES 00094138-5-1 (January 2001).

*Evaluation of Storage Vessels X-508 and X-509 for Continued Use*, APTECH Report AES 00013879-3-3 (September 2000).

*Determination of Critical Crack Size for the Rocket Rod Vehicle*, APTECH Report AES 00013877-5-1, with R. Yee (February 2000).

*Inspection and Evaluation of Cracking in the Steam Ports of the High Pressure Turbine of Engine 1 on the USS Cleveland (LPD-7)*, APTECH Report AES 99093783-5-1 (September 1999).

*Analysis of the Interference Fit Connection Between the Transjector Core and Nozzle*, APTECH Report AES 99063735-5-1 (August 1999).

*Evaluation of Fracture Surface on a Failed Pole Extension Arm*, APTECH Report AES 99073744-2-1 (July 1999).

*Evaluation of the 30-Year Safety Margin for Monopoles Subjected to Fatigue Loading*, APTECH Report AES 99043681-5-1 (July 1999).

*Stress and Fracture-Mechanics Analysis Evaluation of On-Orbit Nickel-Hydrogen Cell*, APTECH Report AES 98113569-5-1 (February 1999).

*Repair of Cracks Found in Interface Connections to the Marriott Ballroom Girders*, APTECH Report AES 98023307-5-3 (November 1998).

*Reexamination of the High Pressure Turbine Shell for Engine 2 on the USS Coronado*, APTECH Report AES 98093526-5-1 (October 1998).

*Fitness-for-Service Evaluation of Field Weldments in Long Span Girders of the Marriott Hotel Yerba Buena Ballroom*, APTECH Report AES 96032704-5-1, with G. Egan, et al. (June 1996).

*Fitness-for-Service Analysis of Indications Found in the Main Steam Line Piping at the Mohave Generating Station*, APTECH Report AES 95012358-2-1 (February 1995).

*Analysis of Gates Aerospace 125-Hour Battery Pressure Vessel*, APTECH Report AES 92101794-5-1, (February 1993).

*Fatigue Analysis on the Pressure Vessel of the Nickel-Hydrogen Cells for the Earth Observing System*, APTECH Report AES 82101778-5-1 (December 1992).

*Stress Analysis for Intelsat 17-A Nickel Hydrogen Batteries*, APTECH Report AES 91081499-6 (March 1992).

*Safe Life Analysis for Earth Observing System Batteries*, APTECH Report AES 91081502-5-1, with C. Vass (January 1992).

*Crack Initiation, Growth, and Suitability-for-Service Analysis of the Blade Mounting Grooves in the High Pressure Rotor, Harbor Station, Unit 5, LADWP*, APTECH Report AES 90091314-2-1, with C. Vass (December 1990).

*Nondestructive Examination of the Cracking Found on the Lower High Pressure Turbine Shell, Engine 2 on the USS Coronado*, APTECH Report AES 90031206-6-1 (December 1990).

*Stress and Fatigue Crack Growth Analysis of the CF-6 Fan Disk Failure During United Airlines Flight 232*, APTECH Report AES 89121165-4-1, with P. Besuner (February 1990).

## **ADDITIONAL INFORMATION**

For more information regarding APTECH's personnel and services, please contact our Corporate Headquarters in Sunnyvale, California (USA) at (408) 745-7000 or visit our website (<http://www.aptecheng.com>).