

Luis R. Carney, Ph.D., P.E.

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KNOWLEDGE & EXPERTISE

Over thirty years of experience as a materials engineer, failure analyst and accident investigator in the aviation, manufacturing and industrial maintenance fields.

EMPLOYMENT HISTORY (1989 to Present)

Materials Engineer & Technical Supervisor (Sr. rank since 2001/Team Lead since 2015)
Naval Air Systems Command (NAVAIR) at Fleet Readiness Center Southeast (FRCSE)
Materials Engineering Division; Polymers & Composites, Metals & Ceramics Branches.
Naval Air Station Jacksonville, FL 32212-0016

2014 - Present:

Materials Engineer, Metallurgist & President
Southeastern Metallurgy, LLC

DUTIES (1989 to Present W/ Naval Air Systems Command-NAVAIR)

- ❖ Technical Supervisor of 11+ engineers & technicians (since 2015).
- ❖ Metallurgical failure analysis and accident investigation (personally performed 700+; involved in 5,000+ over 30 Yrs).
- ❖ Engineering problem solving of aircraft engines, systems, structures, manufacturing issues and industrial infrastructure.
- ❖ Corrosion identification, prevention, and control.
- ❖ Welding design & evaluation (SMAW, GMAW, GTAW & Others).
- ❖ Design & manufacturing of new parts or reverse engineering of old parts.
- ❖ Material & process selection, forming, forging, conventional machining, welding, heat treating, machine grinding, electric discharge machining, casting, additive manufacturing, and shot peening.
- ❖ Polymers and composites design, selection, degradation, and investigations.
- ❖ High temperature materials, turbine cases, blades, disks, and shafts.
- ❖ Heat, lightning strike, and fire damage evaluations & Investigations.
- ❖ Writing of single or multi-component repair instructions and processing specifications.
- ❖ Consultant to engines, systems, and structures engineering staff in failure prevention, repair, and part design.



Instructor:

- ❖ Train new Materials Engineers (40+) in failure analysis, materials and processes.
- ❖ Train Aerospace & Mechanical Engineering staff (350+) in materials and processes.
- ❖ Train Technicians (400+) in special skills and new manufacturing techniques.

UNIVERSITY EDUCATION



Doctoral: Materials Science and Engineering, University of Florida, 2006.
Focus: Metallurgical Failure & Mechanical Design.

Master's: Materials Science and Engineering, University of Florida, 1995.
Focus: Metal & Polymer Composite Materials & Mechanical Design.

Bachelor's: Materials Science and Engineering, University of Florida, 1991.
Focus: Metals, Polymers & Mechanical Design.

REPRESENTATIVE AVIATION & INDUSTRIAL EXPERIENCE

<u>AIRFRAMES</u>	<u>ENGINES</u>	<u>INDUSTRIAL</u>
Cessna CJ2 Jet (525A)	Williams FJ44	Personnel Work Stands
P-8 Poseidon (Boeing 737)	CFM (GE/Snecma) CFM56	Wing Supports
E-6 Mercury (Boeing 707)		Tooling Design & Mfg.
P-3 Orion (Lockheed Electra)	Rolls Royce T56 (501-D)	Steel Chains & Wire Rope
T-44 Pegasus (Beechcraft King Air)	Pratt & Whitney PT-6	Fuel Delivery Pipe
SH-60 Seahawk (Sikorsky S-70B)	General Electric T700	Acidic Processing Tanks
TH-57 Sea Ranger (Bell Jet Ranger 206)		Heating & Air Conditioning
Boeing F/A-18 A-D Hornet	General Electric F404	Overhead Cranes
Boeing F/A-18 E/F Super Hornet	General Electric F414	Tow Trucks & Devices
Boeing F/A-18 G Growler		Machining & Welding Fixtures
Grumman F-14 Tomcat		Test Stands
Northrop F-5 Tiger	General Electric J85 (CJ610)	Engine Support Stands
Vought A-7 Corsair	Allison TF41	Fire & Fire Protection
Grumman EA-6B Prowler	Pratt & Whitney J52 (JT-8D)	Electrical Faults
Lockheed S-3 Viking	General Electric TF34 (CF34)	Heat Treat Fixtures
North American T-2 Buckeye	General Electric J85 (CJ610)	Specialized Machinery
Boeing T-45 Goshawk		Special Fasteners
T-6 Texan II	Pratt & Whitney PT-6	Safety Equipment Eval.

TYPES OF LEGAL CASES TO DATE (@ Southeastern Metallurgy)

Mechanical Failures • Aircraft Corrosion & Poor Maintenance • Automobile Front Suspension Failure • Truck Suspension Failure • Welding Failures (Steel & Aluminum) • Motor-Bike Front Fork • Welding Accident • Truck Drive Line Failure • Tractor Fire • Condominium Railing Corrosion • Sports Equipment Failure • Horse Trailer Corrosion • Graphite/Epoxy Composite Structural Failure • Pipe Corrosion • See Web Site "Legal Experience" for Additional Info.



PROFESSIONAL TRAINING ('91 to present)

- ❖ *F/A-18 Aircraft Drawing & Manufacturing Interpretation Course, FRCSE.*
- ❖ *Field Emission Scanning Electron Microscopy; Tescan Instruments.*
- ❖ *X-Ray Microanalysis by EDS, WDS & EBSD; Oxford Instruments.*
- ❖ *Forging Design & Mfg, Forging Defense Manufacturing Consortium.*
- ❖ *Casting Design & Mfg, American Metalcasting Consortium.*
- ❖ *Composites Failure Analysis, Design & Manufacturing.*
- ❖ *Bearing and Gear Design Technology.*
- ❖ *Fundamentals of Arc Welding.*
- ❖ *Aircraft Accident Investigation, National Transportation Safety Board.*
- ❖ *Superalloys for Heavy Duty Aircraft Gas Turbines.*
- ❖ *Geometric Dimensioning & Tolerancing.*
- ❖ *Cold Expansion Systems Engineering; Fatigue Technologies.*
- ❖ *Scanning Electron Microscopy & X-Ray Microanalysis; Lehigh University.*
- ❖ *Jet Engine Mishap Investigation; U. S. Air Force.*
- ❖ *F-14 Aircraft Bulkhead Quality Hole Machining; US Navy-NADEP Norfolk.*
- ❖ *Aircraft Composite Structure Producibility & Quality; Wichita State University.*
- ❖ *Aircraft Powerplants; FAA.*
- ❖ *Advanced Composites Training; Abaris.*

PUBLISHING & PRESENTATIONS

- ❖ Journal Article: *L. Carney and J. Mecholsky, "Relationship between Fracture Toughness and Fracture Surface Fractal Dimension in AISI 4340 Steel," Materials Sciences and Applications, Vol. 4 No. 4, 2013, pp. 258-267.*
- ❖ Journal Article: *Mueller, E., Carney, L. & Mixson, K., "Use of Eddy Current Conductivity and Hardness Testing to Evaluate Heat Damage in Aluminum Alloys," J Fail. Anal. and Preven. (2017). <https://doi.org/10.1007/s11668-017-0380-6>.*
- ❖ Ph.D. Thesis: *Relationship Between Fracture Toughness And Fracture Surface Fractal Dimension In AISI 4340 Steel, University of Florida, 2006.*
- ❖ Presentation: *L. Carney, Introduction to Field Failure Analysis, NAVAIR Air Vehicle Engineering Conference, 2018.*
- ❖ Presentation: *L. Carney and N. Fulton, Load Flow in Multi-Stack Joints, NAVAIR Air Vehicle Engineering Conference, 2009.*
- ❖ Presentation: *L. Carney, Elimination of Baking Operations Following Nitric Acid Based Temper Etching, NAVAIR Air Vehicle Engineering Conference, 2007.*
- ❖ Presentation: *L. Carney, Failure Analysis of Turbine Engine In-flight Failure, AeroMat Conference, 2004.*
- ❖ Presentation: *L. Carney, Failure Analysis of Turbine Engine Compressor Front Hub/Disk, AeroMat Conference, 2004.*
- ❖ Presentation: *L. Carney, Tailhook Failure & Aircraft Mishap, University of Florida Graduate Students & Faculty, 2004.*
- ❖ Other Journal Related: *Journal Article Reviewer & Advisor, Metallurgical and Materials Transactions A, 2014-Present.*



INDUSTRIAL SPECIFICATIONS, PRINCIPAL AUTHOR

- ❖ Local Process Specification, **Manual and Portable Machine Drilling of Aircraft Structures**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Inspection Criteria for Drilled Holes in Aircraft Structures**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Heat Damage Evaluation of Aviation Alloys**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Manual Blending of Aviation Alloys and Platings**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Electric Discharge Machining**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Low Stress Machine Grinding**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Post Grind Inspection of Chrome Plated Surfaces**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Machine or Manual Shot Peening**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Portable Rotary-Flap Peening**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Temper Etch Inspection**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Hydrogen Embrittlement Relief**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Manufacturing of Special F/A-18 Wing Skin Attachment Fastener**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.

INDUSTRIAL SPECIFICATIONS, CO-AUTHOR OR APPROVING AUTHORITY

- ❖ Local Process Specification, **Heat Treating of Steel**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Heat Treating of Aluminum**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Welding**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.

AIRFRAME/ENGINE OR INDUSTRIAL MANUFACTURING & REPAIR SPECIFICATIONS, METALLURGICAL ENGINEERING REVIEW & APPROVAL AUTHORITY

- ❖ Review and approve the metallurgical aspects of airframe/engine or industrial local engineering repair specifications. For example: corrosion removal & control, welding, machining, and a wide variety of metallurgical processing operations.



SELECTED CAREER AWARDS

- 2018 ▶ From Naval Air Systems Command for developing national training and skills certification program for aircraft structural mechanics, grinding machinists, shot peening and cold working of structural holes.
- 2016 ▶ From Materials Engineering Division Jacksonville for significantly reducing engineering investigation turn-around time, training new engineers.
- 2015 ▶ From Materials Engineering Division Jacksonville for completing multiple high profile engineering investigations (several engine & airframe losses).
- 2012 ▶ From Commander, Naval Air Warfare Center, for support of the T-45 Aircraft Hook Shank Production Restart Team.
- 2011 ▶ From Materials Engineering Division Jacksonville for skillful and professional completion of jet trainer mishap investigation involving airframe loss.
- 2010 ▶ From Materials Engineering Division Jacksonville for the performance of high-visibility failure analysis of a main landing gear trunnion and suggestions for improvement.
- 2009 ▶ From Materials Engineering Division Jacksonville for completion of numerous analyses and investigations of Navy/USAF turbofan engine turbine failures.
- 2009 ▶ From Materials Engineering Division Jacksonville for support of turboprop engine compressor blade failures.
- 2008 ▶ From Materials Engineering Division Jacksonville for failure analysis of three separate instances of air-to-air refueling hose failure.
- 2006 ▶ From Materials Engineering Division Jacksonville for completion of high visibility failure analysis a jet aircraft wing spar.
- 2006 ▶ From Program Executive Officer, Tactical Aircraft Programs for professionalism and technical expertise in the investigation of the effects of contamination on jet engine bearing damage.
- 2005 ▶ From Commanding Officer, Marine Aircraft Group 31 for outstanding response and support in rapidly inspecting several heat-damaged jet aircraft.

- 2000 to Present ▶ Multiple awards throughout the years from Materials Engineering Division Jacksonville and Production Supervisors for support of FRCSE plant manufacturing shop operations including machining, grinding, and shot peening.
- 2000 to Present ▶ Multiple awards throughout the years from Materials Engineering Division Jacksonville and FRCSE Production Supervisors for providing training to engineers and artisans, especially classes required to recertify in special skill areas.

OTHER RELEVANT EXPERIENCE & TRAINING (1979-1985)

- ❖ Auto, Truck, Gas & Diesel Engine Mechanic: Various employers.
- ❖ Auto & Truck Training: OJT & Westside Skills Center, Jacksonville, FL.
- ❖ Awards: Placed or won Regional and State Vocational Industrial Clubs of America (VICA) Diesel Truck Mechanics competitions.

