

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

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**KNOWLEDGE & EXPERTISE**

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

**EMPLOYMENT HISTORY**

**1989 to 2024; Retired:**

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 2024 W/ Naval Air Systems Command–NAVAIR)**

- ❖ Technical Supervisor of 11+ engineers & technicians (since 2015).
- ❖ Work with nearly all classes of materials including metals, ceramics, glasses, polymers and composites.
- ❖ Metallurgical failure analysis and accident investigation (personally performed 850+; involved in 5,000+ over 34 Years).
- ❖ 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, ceramics parts and coatings, 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 (50+) in failure analysis, materials and processes.
- ❖ Train Aerospace & Mechanical Engineering staff (650+) in materials and processes.
- ❖ Train Technicians (800+) 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
TH-73 Thrasher (Leonardo)		Overhead Cranes
Boeing F/A-18 A-D Hornet & E/F Super Hornets	General Electric F404 & F414	Tow Trucks & Devices
C-130 Transport		Machining & Welding Fixtures
Grumman F-14 Tomcat		Test Stands
Northrop F-5 Tiger		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)

Aircraft Corrosion & Poor Maintenance • Automobile & Truck Front Suspension Failures  
• Crane Failures & Collapse • Dump Truck Bed Collapse • Contract & Manufacturing Disputes • Truck Brake Failure & Accident • Welding Failures (Steel & Aluminum) • Motor-Bike Front Fork Failure • Welding Equipment Accident • Truck Drive Line Failure • Tractor Fire • Condominium Railing Corrosion • Industrial Generator Engine Failure • Sports Equipment Failure • Shoulder Implant Failure • Graphite/Epoxy Composite Structural Failure • Boat Propeller Casting Failure • Fuel Pipe Failure & Massive Leak  
• See Web Site “Legal Experience” for Additional Info.

## LEGAL PARTICIPATION (as of 08/10/2024)

- ❖ Number of Cases: 49. Most cases settle after initial opinions rendered.
- ❖ Depositions: 9.
- ❖ Daubert Challenges: 1 (Motion Denied to opposing counsel).
- ❖ Trial Testimony: 2; one before judge for Daubert challenge; one arbitration.
- ❖ Plaintiff: 36, Defendant: 13      Federal: 8, State: 40, Arbitration: 1

## PROFESSIONAL TRAINING ('91 to present)

- ❖ Aircraft Accident Investigation, National Transportation Safety Board.
- ❖ Jet Engine Mishap Investigation; U. S. Air Force.
- ❖ F/A-18 Aircraft Drawing & Manufacturing Interpretation Course, FRCSE.
- ❖ Scanning Electron Microscopy & X-Ray Microanalysis; Lehigh University.
- ❖ Field Emission Scanning Electron Microscopy; Tescan Instruments.
- ❖ X-Ray Microanalysis by EDS, WDS & EBSD; Oxford Instruments.
- ❖ Metallurgy of Steel, Stainless, Nickel and Titanium Alloys (Numerous CE Courses)
- ❖ Engineering Design Statics; Texas A & M University
- ❖ Engineering Design Mechanics of Materials; Texas A & M University
- ❖ Aircraft Powerplants; FAA.
- ❖ Forging Design & Mfg, Forging Defense Manufacturing Consortium.
- ❖ Casting Design & Mfg, American Metalcasting Consortium.
- ❖ Composites Failure Analysis, Design & Manufacturing.
- ❖ Fundamentals of Arc Welding.
- ❖ Superalloys for Heavy Duty & Aircraft Gas Turbines.
- ❖ Geometric Dimensioning & Tolerancing (GD & T).
- ❖ Cold Expansion Systems Engineering; Fatigue Technologies.
- ❖ F-14 Aircraft Bulkhead Quality Hole Machining; US Navy-NADEP Norfolk.
- ❖ Aircraft Composite Structure Producibility & Quality; Wichita State University.
- ❖ 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*, 2014-2020.

#### 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, **Manual Electric Discharge Machine Drilling (E-Drill) 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, **Inspection Criteria for Machined Aircraft Components**, 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.
- ❖ Local Process Specification, **Cold Working of Holes in Aircraft Structures**, Fleet Readiness Center Southeast, Naval Air Systems Command—Jacksonville.
- ❖ Local Process Specification, **Cold Installation of Bushings and Other Hardware**, 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

- 2019 ▶ From Materials Engineering Division Jacksonville for quickly evaluating compliance of structural fasteners with specification requirements.
- 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 Repair Training: OJT & Westside Skills Center, Jacksonville, FL.
- ❖ Awards: Placed or won Regional and State Vocational Industrial Clubs of America (VICA) Diesel Truck Mechanics competitions.

