

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

State of Florida PE Lic.: 0052588
Contact Phone: (904) 233-3660
Email: SE_Metallurgy@Comcast.net
Web: SoutheasternMetallurgy.com
Office: Jacksonville, FL



KNOWLEDGE & EXPERTISE

Over thirty-four 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).
- ❖ 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 • 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 01/01/2024)

- ❖ Number of Cases: 45. Most cases settle after initial opinions rendered.
- ❖ Depositions: 7.
- ❖ Daubert Challenges: 1 (Motion Denied to opposing counsel).
- ❖ Trial Testimony: 2; one before judge for Daubert challenge; one arbitration.
- ❖ Plaintiff: 34, Defendant: 11 Federal: 8, State: 36

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).
- ❖ 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.