



ASM - Atlanta

Newsletter of the Atlanta Chapter of ASM International
<http://www.asm-atlanta.org/> Normally Meets 3rd Tuesday
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Meeting Tuesday, February 22, 2005!

Joint Meeting of the Atlanta Chapters of AIAA & ASM International

Application of the F/A-22 Full-Scale Test for Durability

presented by

Tom Brussat
Lockheed Martin Aeronautics

Meeting at the Sheraton Suites Galleria
2844 Cobb Parkway SE
Atlanta

Directions: The **Sheraton Suites Galleria** is located directly across from the **Cobb Galleria Centre** and adjacent to the **Cumberland Mall**.

From Downtown Atlanta - Take Interstate 75 North to Interstate 285 West. Exit onto Cobb Parkway/GA State Highway 41 (Exit 259B). Turn left at the light. The hotel is immediately on your right side. The phone number for the Sheraton is: 770-955-3900. (The location of our last two ASM Christmas Parties.)

Our hosts, the AIAA, are making all of the arrangements for this meeting.
Bob Greene, AIAA Atlanta, 1z9a@bellsouth.net, 770 879 7989 x11.

RSVP: Go to the AIAA Web Site at http://www.aiaa-atlanta.org/mtg2005_02.html to make your reservations. ASM members are to identify themselves as "Guests" so that our cost is \$15, or the same as AIAA members.

If this mode of making your reservation proves to be a problem for any ASM members, you can make your reservation, as usual, with Marlene White, Tel: (404) 894-2850, Fax: (404) 294-9140, marlene.white@mse.gatech.edu.

We are advised to make our reservations by COB Friday, February 18, 2005!

Tuesday, February 22, 2005

Menu: Marinated flame broiled flank steak, Caesar salad, Chef's choice of vegetables & dessert. * Vegetarian meals are available.

5:30 PM Social Hour

6:30 PM Dinner

7:30 PM Program

\$15 Members/Guests

\$19 Non-Members

\$10 Students

About the Presentation by Dr. Brussat:

The F/A-22 Full-Scale Durability Test completed 2.68 test lifetimes without catastrophic failure. This paper assesses the approach for application of the test results and the durability analysis for verifying the life of the F/A-22 airframe structure. The verification approach is complicated by the fact that 3 different loading spectra were involved. The design analysis for drawing release of the test aircraft was based on the Design Loading Spectrum; the Test Spectrum was based on an updated and more severe spectrum; and the durability verification is evaluated against an updated "Verification Spectrum" that is even more severe than the test spectrum. Consequently

- The predicted life for some areas of the structure was less than 2 lifetimes of the Test Spectrum.
- Many areas of the structure required significantly more than two lifetimes of testing to demonstrate a two-lifetime capability for the Verification Spectrum.
- Due to design updates, several structural details on the durability article had been improved on Production aircraft.

Thomas R. Brussat, PhD, Structures Staff, Lockheed Martin Aeronautics, Marietta, Georgia
Dr. Brussat has 38 years of experience in fatigue and fracture mechanics, including 20 years of research and development, and the past 18 years as Technical Lead for Durability and Damage Tolerance for the F/A-22 "Raptor." He has published numerous technical papers and has taught crack growth analysis applied to metallic aircraft structure in an annual UCLA short course since 1975.

A message from the ASM Atlanta Chapter Chairman – George Kremer:

If you visit the ASMI website located at: <http://www.asminternational.org/> you will find the following statement at the top of the first page:

"ASM International is the society for materials engineers and scientists, a worldwide network dedicated to advancing industry, technology and applications of metals and materials."

In the commercial and military aircraft sectors we see a dedication to advancing engineering materials, making them more efficient and extending their life cycle expectations. To accomplish this, materials engineers consider a wide range of disciplines required to test, inspect and produce components / assemblies with a high degree of reliability. Some of these disciplines include: new and innovative inspection techniques, three dimensional modeling, superior cost effective production techniques, and advanced fatigue / fracture analysis. A study of these disciplines show that without the knowledge and dedication of materials engineers projects such as: the Boeing 777 or the Lockheed Martin F/A-22 Raptor Advanced Tactical Fighter Aircraft would not become a reality. Oftentimes we look at the big picture and see only the final results of the project. However, materials engineers are trained to consider: fracture / fatigue, corrosion / wear, advanced coatings, ceramics, high strength alloys, durable composites, and the processes of heat treating, brazing and welding. Since no one materials engineer can possibly handle all of these processes, ASMI provides resource networking so that collaboration and communication will foster an effective team spirit. In addition, ASMI provides seminars and vast material databases so that engineers and scientists can effectively achieve their goals and advance technology into new and exciting areas never before realized by a conventional approach to the problems at hand.

During my career as a private pilot I have enjoyed the sensation of aerobatic solo flying and the freedom it brings. I was privileged to fly an aerobatic Cessna 152 and a Starduster SA-300. My training was complete and precise. My knowledge of airframes and long-term fatigue on aircraft structures was, at that time, lacking. I later discovered that any aircraft subjected to stresses near or outside its' flight envelope needed to be carefully examined by both the A&P mechanics and the pilot in command. As airplanes spend more time on the ground than in the air, I also realized that my safety depended on a closer look at some of the factors that contribute to aircraft structural damage. These factors include: where the aircraft is stored, what area of the country does the aircraft spend most its time, the amount of flying hours and if the aircraft structure was over-stressed.

During the early life of the aircraft some of these items can be visually inspected on a daily basis, or at the periodic maintenance intervals. However, it's the seemingly non-detectable problems that greatly contribute to the pilot's safety and the continued reliability of the aircraft. When I simply reviewed the aircraft's logbooks and talked to the A&P mechanics, I found that I was missing a large part of the aircraft's history. It was only after a careful review of: information from the FAA's Aging Aircraft Summit meetings, meetings with airplane owners and joining conscience flying clubs that I learned to have a greater respect for aging aircraft, inspections and approved repair procedures. In summary, having this knowledge provided me with greater enjoyment of aerobatic flying, as well as a feeling of confidence that the aircraft that was about to stress to it's limits would never let me down.

George Kremer – Chairman
ASM Atlanta Chapter 2004 - 2005

Position Available Engineering and Quality Manager

Senior Metallurgical Engineering Position

Independent commercial metallurgical testing laboratory in the Charlotte/Lake Norman area is seeking a Senior Metallurgical Engineer to add to its growing staff. The company is firmly established as a recognized leader in failure analysis, corrosion investigations and metallurgical engineering for a wide range of industries including; motor sports, aerospace, power generation and utilities, marine, transportation, chemical processing, and insurance & legal.

Position Requirements and Responsibilities:

At least a BS in Metallurgy or Materials Engineering with a minimum of 5 years of engineering experience in failure analysis and metallurgical engineering in a testing laboratory environment. Individual must have excellent communication skills and be able to interpret and articulate analysis results for clients. Requires strong technical report writing skills, analytical and problem solving, proficient in materials testing procedures and forensic investigations. Responsible for managing multiple projects at a time, preparing proposals and cost estimates for clients, organizing and scheduling procedures, supervision of technicians, and meeting client turnaround expectations.

Individual should have hands on experience operating and maintaining metallurgical equipment including **SEM/EDX**, working knowledge of **fractography**, **metallography**, **mechanical** and **corrosion testing**, and **digital imaging software**. This position requires confidence, maturity, efficiency, enthusiasm and a desire to work in a fast paced dynamic and friendly environment.

The ideal candidate will be a registered PE (metallurgical engineering) with 5-10 years experience in an independent metallurgical laboratory who has drive, focus, initiative and leadership skills who also demonstrates knowledge of sound business practices. However we will consider an individual with less experience who has passed their EIT and will sit for the PE exam in the near future, also having strong qualifications and potential.

To apply for this position: submit your resume, along with salary history and requirements to: **Metallurgical Technologies, Inc.**, Human Resources Dept., 160 Bevan Drive, Mooresville, NC 28115. We offer an excellent benefits package with competitive salaries and have a talented team of people in an outstanding workplace environment. For information about our capabilities and typical projects, see our website at: www.met-tech.com (please do not submit resumes to our website contact, you may email your resume to our HR director at: Bpendergrass@alltel.net) The rapidly growing Mooresville area is located on Lake Norman and offers numerous recreational, social, educational and cultural opportunities.

Features of ASM-Atlanta
The Newsletter of the Atlanta Chapter of ASM International

- Program Notes for Meetings
- Chairperson's note to members.
- Career Development: job opportunities or jobs needed
- Company Feature:
- Technical Features:
- Education Feature: Materials course offerings.
- Georgia Tech Student Chapter News
- Member News
 - Special Events, Awards & Honors.
 - New Members
 - Deaths
 - Transitions
- ASM International News
- Advertisements
- Outreach (ASM members to Schools, Scouts, etc.)

Send information, articles or suggestions to:

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