

# COMPOSITE REPAIR FOR AIRCRAFT STRUCTURES

Acquire Practical Knowledge and Latest Updates on Advanced Composite Repair in the Aviation Industry

4 – 6 April 2011 ■ Holiday Inn Singapore Orchard City Centre

## About Composite Repair for Aircraft Structures (CRAS2011)

In view of growing importance of advanced composites in aviation industry, repair and maintenance expertise pertaining to composite materials has become the main focus of airlines and MROs worldwide. As this is still a rapidly developing field of knowledge, it is critical for repair and maintenance personnel in aviation industry to understand the intricacies of composite repair and at the same time, keep themselves up to date with the latest developments in repair methods.

Composite Repair for Aircraft Structures 2011 (CRAS) aims to address such critical needs in aviation industry by providing participants with **essential knowledge** and **latest advances in composite repairs**. Various **repair processes** and **techniques** will be reviewed extensively. Repair knowledge **with reference to B787 and A350** will also be discussed. Backed by extensive **industry examples** and **case studies**, CRAS ensures that participants achieve in-depth and practical understanding of the subject matter for actual application.

## Benefits of Attending CRAS2011

- ✓ Assess latest developments and best practices in advanced composites repairs.
- ✓ Achieve in-depth understanding on repair techniques and processes.
- ✓ Understand repair challenges faced in today's advanced aircraft composites.
- ✓ Review composite structures, materials and laminate design leading to repair.
- ✓ Acquire repair knowledge with reference to aircraft models including B787 and A350.
- ✓ Review common damage types and their causes in composite structures and the hidden "unseen" dangers.
- ✓ Assess advanced inspection methods for detecting hidden damage in composites.
- ✓ Study real-life case studies and examples in composite repair

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## ADVANCE YOUR KNOWLEDGE IN AIRCRAFT COMPOSITE REPAIR!

CRAS 2011 is a course not to be missed for those seeking to advance their knowledge in aircraft composite repair. In just 3 days, participants will receive an exceptional amount of information that will be relevant to their operations, regardless of the nature of their personal involvement in composite repairs.

## 8 HIGHLIGHTS OF THE COURSE

1. **Composite Aircraft Materials and Structures:**
  - Fiber reinforcements (Carbon, Aramid, Glass)
  - Matrix resin systems (Epoxy, Polyester, Bismaleimide)
  - Thermoplastics
  - Sandwich core materials
  - Others
2. **Repair techniques using both wet-resin / hand lay up and pre-preg heat accelerated (Hot Bonded) cures**
3. **Advanced Inspection Methods**
  - Ultrasonics
  - Laser Shearography
  - Thermal Imaging
  - Others
4. **Boeing 787 and Airbus A350 advanced carbon fibre construction methods**
5. **Essential elements of composite laminate design for repair processes**
6. **Case studies of structural failures in primary composite aircraft structures**
7. **Hands – on demonstration on Carbon Fiber Pre-Preg and Hot Bonded Repair**
8. **Common damage types and their causes to composite structures and the hidden "unseen" dangers**



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# COMPOSITE REPAIR FOR AIRCRAFT STRUCTURES

## MEET YOUR MASTER TRAINER



**Wilson J. Boynton, CET, CCT-I**  
President  
ACT (Advanced Composite Training)

Wilson is an accomplished instructor in aircraft maintenance and advanced composite materials technologies.

As an aircraft maintenance engineers and trainer with extensive experience in advanced composites, Wilson has worked on a full range of composite aircraft and structures from the Airbus 340,330,320 series and Boeing 737 and 777 series. He has provided numerous repair and training services to companies as large as ADAT- Abu Dhabi Aerospace Technologies and to clients of the Cessna Aircraft Company on their all-composite Corvalis 400TT aircraft.

Wilson initially worked in the helicopter industry before joining Great Lakes Airlines in London Ontario, the forerunner of Air Ontario, now JAZZ Airlines. From 1987 to 1996, Wilson was the Supervisor of Technical Services - Liaison Engineering in Air Ontario. Air fleet consisted of Bombardier 100/300 series aircraft. He was responsible for all repair design, repair process specification, Quality Assurance, and hands-on completion for aircraft composite structures.

In 1994, Renaissance Aeronautics Associates Inc. (RAA) was incorporated with Wilson as the President. RAA was the first private company to be both accredited by the CAMC and approved by Transport Canada to teach aircraft composite structural repair.

In 2009 Wilson was presented with the CAMC "Outstanding Individual Award" for his support of, and commitment to, the work of the CAMC and it's goals. He is also a contributing writer for Avi Nation magazine and has received editorial awards for his contributions to the Ontario Technologist Magazine.

Wilson has been the invited lecturer/speaker on Aircraft Composite Repair in the following events:

- Great lakes International Aviation Conference 1996 - 2010
- Ontario Aircraft Maintenance Engineers Workshop 1996 - 2010
- Canadian Aviation Maintenance Council 1996 - 2010
- Professional Aircraft Mechanics Association 2009, Dallas Texas

## ABOUT ADVANCED COMPOSITE TRAINING (ACT)

From Manila in the Philippines, across the Americas, through Europe and to the United Arab Emirates, ACT has trained aircraft structures technicians in all aspects of composite airframe manufacture & structural repair. ACT's courses are fully approved by the USA Federal Aviation Administration (the FAA) and fully accredited by the Canadian Aviation Maintenance Council (CAMC). No other training organization anywhere holds a higher standard of certification for composites training than ACT.

For more details on ACT, please visit [www.raacomposites.com](http://www.raacomposites.com)

## TESTIMONIALS

*"The training is excellent and well organised"*  
Manager Airworthiness/ Flight Operations Division  
Civil Aviation Authority of Singapore  
**Maintenance Steering Group 3**  
**December 2010**

*"The trainer was very knowledgeable"*  
System Engineer  
Denel Dynamics  
**Unmanned Aerial Vehicle**  
**November 2010**

*"The trainer is very clear in his explanations on the subjects discussed. Would like to attend more of his courses in future."*  
Repair Devt Engineer, NORDAM  
**Composite Materials in Aircraft Structures**  
**September 2010**

## THIS COURSE IS RECOMMENDED FOR

- HODs or Managers
- Repair Engineers
- Repair Technicians
- Structural Engineers
- Repair Development Engineers
- Advanced Composites Engineers
- Technical Services Personnel
- Aircraft Maintenance Personnel
- Composites Project Engineers
- Composites Program Managers
- Composites Design & Analysis Engineers
- Quality Control/ Assurance Engineers
- Material Engineers



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## COURSE OUTLINE\*

Registration and coffee starts at 8:30am daily. The course begins at 9:00am sharp and ends at 5:30pm. Lunch and refreshments will be provided for all attendees during the 3-day training.

### DAY 1

- Overview of the historical and current applications of composite materials in modern aero structures
- Advanced composite manufacturing methods – Automated Lay-up & Spray up (SME Society of Manufacturing Engineers)
- Health & Safety lecture specific to working with toxic composite materials
- Referencing the Boeing 787 and Airbus A350 advanced carbon fiber construction methods
- Reinforcement fibers, Glass / Aramid / Carbon / Boron / Hybrids / Spectra, the handling, storage, shipping, quality assurance consideration.
- Pre-Preg fibers, handling, storage, shipping, quality assurance considerations
- Lightning strike protection, application of various conductive mesh / coatings to aircraft composite structures

### DAY 2

- Matrix materials, polyester / epoxy / polyurethanes / adhesives / additives
- Core materials, the handling, storage, shipping, quality assurance considerations
- Basic composite laminate design theory, explaining the orientation / lay-up techniques that are required for aero structures manufacturing & repair i.e. Quasi-Isotropic, Symmetrical, Balanced, Thermal Balanced & Nested Laminates
- Composite awareness, aircraft structures & damage repair
- Damage types & causes, composite structural failures, inspecting for damage
- Non-Destructive Testing methods for composite structures, Mechanical Impedance, Ultrasonics, Laser Shearography and Thermal Wave Imaging (Thermography)

### DAY 3

- Methods, techniques & technologies of composite structures repair
- Review of structural repair techniques with emphasis on precision for step scarfing
- Introduction to Hot Bonder operations, thermocouples, blankets, programming cure cycles
- Understanding thermal properties of structures, heat-sink problems when bonding
- Repair of Bonded Metal Structures – in overview of the surface treatment processes, materials and techniques used in repair / bonding of metal aircraft structures
- Common repair failures, issues with contamination, out-time products, etc.
- Hands-on demonstration of carbon fiber structural repair including vacuum bag techniques, cure cycle development, vacuum bagging materials and selection criteria

#### Note:

- Entire lecture program is supported with an extensive and complete PowerPoint presentation which utilises photographs, graphs & charts, drawings & text to support the theory and hands-on demonstrations.
- Final Q&A session available.
- Numerous "Show & Tell" sample items (i.e. vacuum bag materials, fabric materials, etc.) will be available during the course.

## ABOUT K2B INTERNATIONAL

In today's business world it's knowledge that drives opportunities and advancement.

K2B International, standing for Knowledge 2 Business, is dedicated to creating content-rich communities – in the form of technical training courses, conferences, summits and online portals – providing platforms for gaining knowledge when it's needed most.

Delivering practical insights from seasoned practitioners, each K2B forum empowers participants to make a real difference in their organisations. For more information, visit [www.k2binternational.com](http://www.k2binternational.com).

## PRE-COURSE QUESTIONNAIRE

K2B International's training is structured to provide cutting edge and intense training directly applicable to your organisation. We are committed to delivering the highest possible standard of training and ensuring that you gain maximum benefits from your training participation. To do that, you will be asked to complete a pre-course questionnaire that will help identify specific interests and needs to personalise the trainer's delivery to you.

## LOYALTY PROGRAMME

Thank you for supporting K2B International's defence training events. If you participated in any of K2B's training courses in 2010, simply quote your discount code and enjoy SGD100 off when you register for our training course in 2011!

## EARLY BIRD DISCOUNTS

Sign up for this course before **18 February 2011** to enjoy discounts up to **SGD300**.