

FATIGUE & DAMAGE TOLERANCE COURSE

Fatigue & Damage Tolerance Course in Melbourne Australia June 27- July 1, 2011

TASS Asia Pacific is pleased to announce that it will be holding a Fatigue and Damage Tolerance Analysis Course for interested participants in the aerospace industry and for individuals who are actively involved in the analysis, substantiation, certification and maintenance of structural aspects of aircraft and aerospace structures.

This active participation course gives the student a good mix of theory and problem solving that are relevant to their current work situations.

If you have questions regarding this course, please contact: training@tassinc.com

Course Information including Outline and Hotel

Registration Form

Course Outline

June 27th to July 1st, 2011 - The Blackman, Art Series Hotel, Melbourne, Australia

Fatigue and Damage Tolerance Course

Course Description

This course describes the concepts of fatigue, fracture mechanics and damage tolerance in aerospace structures from an academic and practical level for working level engineers. Subjects include fatigue mechanisms, fatigue properties and strength, stress intensity factor, damage accumulation, widespread fatigue damage, load spectra, variable amplitude loading, residual strength and failure criterion, fretting, corrosion and inspection methods. Analytical and numerical approaches to fatigue, fracture mechanics will be discussed. This course provides technical foundation for performing analysis to show compliance to Aging Aircraft Safety Rule and Widespread Fatigue Damage requirements.

The course will be delivered by Dr. Patrick Safarian, P.E. and Dr. Damian Horrigan of TASS Inc.:

Dr. Patrick Safarian, P.E., *Fatigue and Damage Tolerance Technical Specialist*

Patrick Safarian is a fatigue and damage tolerance technical specialist at the FAA. Since 1997 he has been involved in ensuring safety of the existing fleet as well as certification of new products in Seattle Aircraft Certification Office. Prior to that he spend eleven years at the Boeing Company. During that time he contributed to development of methods and allowables for fatigue and fracture mechanics standards for stress engineers, performed analytical and numerical stress analyses of highly complex structures, including failure analysis in support of in-service problems and accident investigations.

Patrick received his BSME from Northrop University in 1983, MSME from California State University, Fullerton, in 1985, and completed his PhD in Mechanical Engineering at University of California, Davis, in 1987. In June 2004 he completed his Doctorate in Theological study at Bakke Graduate School. Patrick has taught damage tolerance and advance engineering mathematics courses while at Boeing for ten years. He has been teaching post-graduate engineering courses in the fields of fatigue, fracture mechanics and finite element analysis in University of Washington and Central Washington University since 1998. Patrick is married to Shohreh, and together they have five children.

Patrick is teaching this course as a private educator and is not representing FAA during his teaching engagement

Dr Damian Horrigan, CPEng, CTO Tass Inc

Damian has over 20 years experience in Fatigue and Damage Tolerance of metallic and composite structures. He has worked in research laboratories, airlines, academia and private enterprise as well as providing consulting services. He has performed a significant amount of structures engineering and damage tolerance analysis for Part 25 aircraft and is a FAA DER including delegation in Damage Tolerance. He has published over 20 papers in international journals and a wide number of papers in published conference proceedings.

Damian received his BE from the University of Melbourne in 1989 and PhD in 1994. He is currently Chief Technology Officer at TASS Inc in Kirkland, USA.



Tass Asia Pacific (AP) 390 Reserve Rd, Cheltenham, Victoria, 3192
Phone: +61 3 405 00 77 83 • ABN: 59 136 175 669

Course Outline

June 27th to July 1st, 2011 - The Blackman, Art Series Hotel, Melbourne, Australia

Fatigue and Damage Tolerance Course

Who Should Attend?

This course has been tailored for interested participants in the aerospace industry and for individuals who are actively involved in the analysis, substantiation, certification and maintenance of structural aspects of aircraft. This is an active participation course which requires the student to come prepared with relevant example problems from their current work situations. Numerous key example problems are worked during the course and are intermingled between the classroom theories that are delivered through the week.

Benefits of Attending

You will be able to have a much better understanding of damage tolerance assessment and substantiation techniques in the aerospace industry for application to:

- Modifications
- Repairs
- Corrosion prevention control
- Fatigue
- Widespread fatigue cracking
- Life assessment of pressurized tanks & welded structures
- Fracture Control Plans

Upon satisfactory completion of homework and project assignments, participants will be granted a Certificate of Completion for the course.



Fatigue and Damage Tolerance Course

Join us at the The Blackman, Art Series Hotel in Melbourne, Australia this June for this intensive five day educational experience in the concepts of fatigue, fracture, and damage tolerance analysis of aerospace structures.

\$2,500 AUD (ex GST)

5 days of training
 Training materials
 Demo access to TASS INC online DTA tools
 Breakfast, lunch and coffee breaks

June 27th to July 1st, 2011
 The Blackman, Art Series Hotel
 Gallery 3

452 St Kilda Road, Melbourne, 3004 Australia

<http://www.artserieshotels.com.au/Blackman/location>

For more information or to register for this course, please contact:

training@tassinc.com

Tass Asia Pacific (AP)

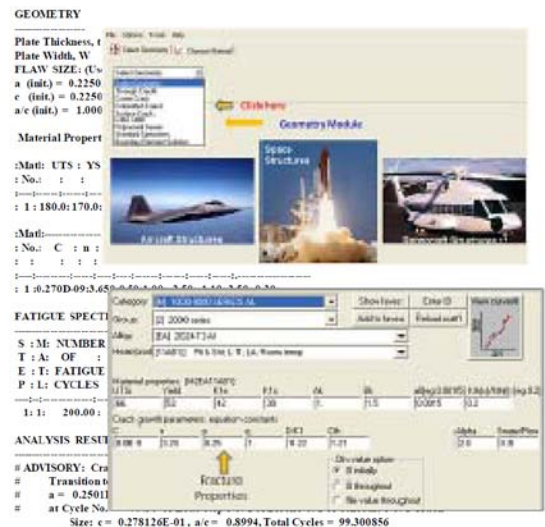
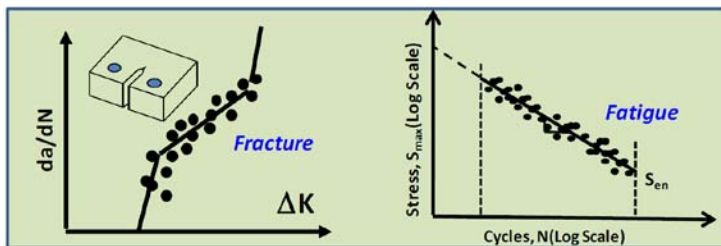
ABN: 59 136 175 669

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Phone: +61 3 405 00 77 83

Course pre-reading: Schijve, Jaap, Fatigue of Structures and Materials, Kluwer Academic Publishers, Second Edition, 2009

Book early as class size is limited in order to assure appropriate instructor – student time for problem solving.



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Text: Schijve, Jaap, *Fatigue of Structures and Materials*, Kluwer Academic Publishers, Second Edition, 2009

Day 1:

- 1. Opening Remarks and Introduction**
- 2. Introduction to Fatigue Mechanism**
 - a. History and Background
 - b. Development of the FAR's
 - c. Crack nucleation
 - d. Crack growth
 - e. Fatigue failure
- 3. Design Considerations**
 - a. Stress concentration
 - b. Eccentricity
 - c. Load transfer
 - d. Hard point
 - e. Residual stresses
 - f. Surface treatment
 - g. Computational tools

Day 2:

- 4. Fatigue Properties**
 - a. Fatigue limits
 - b. S-N curves
 - c. Fatigue diagrams
 - d. Fatigue crack growth
- 5. Fatigue Strength**
 - a. Notched and un-notched specimens
 - b. S-N curves
 - c. Analytical prediction

Day 3:

- 6. Stress Intensity Factors**
 - a. Definition, K
 - b. Elastic crack tip stresses
 - c. Strain energy release rate, G
 - d. Relationship of G and K
 - e. Computation techniques
 - f. Applications
- 7. Fracture Mechanics**
 - a. Griffith theory
 - b. Crack growth properties
 - c. Fracture toughness
 - d. Analytical prediction
 - e. Crack tip plastic zone

- f. Plane stress and plane strain
- g. Application

Day 4:**8. Fatigue Loads and Spectra**

- a. Load spectra
- b. Variable amplitude loading in fatigue
- c. Variable amplitude loading in crack growth
- d. Effects of load history

9. Fatigue Damage Accumulation

- a. Crack growth
- b. Residual strength and failure analysis
- c. Fail safety
- d. Damage Tolerance
- e. Safe life
- f. Inspections

Day 5:**10. Introduction to Non-destructive Inspection**

- a. Inspection techniques
- b. Probability and reliability of inspections
- c. Inspection limitations
- d. Inspector's training

11. Fatigue and Failure of Joints and Structure

- a. Fastened structures
- b. Bonded structures
- c. Stiffened structures
- d. Welded structures

12. Damage Tolerance of Repairs and Alteration

- a. Introduction
- b. Discussion and guidelines of methods
- c. Computer software
- d. Examples- Antenna Installations

Supplemental topics throughout the course include:

- Lessons learned from accidents
- Analytical and numerical methods to fatigue and damage tolerance analyses
- Widespread Fatigue Damage
- Case studies
- Workout examples of repairs and alteration

Homework:

Every evening you will be assigned a set of homework questions/problems to reinforce the concepts that taught in the class. Each homework submission is due on the next day. Having a calculator is necessary and a lap top with access to internet is highly encouraged.

Participation:

Interacting with the instructor and others in the class is key to learning the subject matter. So you are highly encouraged to participate in the discussions and contribute your experience, or ask your questions, to foster a better learning environment.

Project:

A project will be assigned on the last day of the course. The project should be completed presenting the results using all good practices of a technical report, including the problem statement, assumptions, references, documentation of the approach, evaluation and results.

Certificate of Completion:

Participants who satisfactorily complete the homework and project assignments will be granted a Certificate of Completion for the course.

Conference Registration

Submit by Email

Print Form



Conference Name: Fatigue and Damage Tolerance Course

Conference Dates: June 27 - July 1, 2011

Conference Location: Melbourne, Australia

TASS Asia Pacific (AP) Pty
390 Reserve Rd
Cheltenham, Victoria
Australia
3192
Phone: +61 3 405 00 77 83

www.tassinc.com

Date

Attendee Information

Name:	<input type="text"/>
Name (2):	<input type="text"/>
Name (3):	<input type="text"/>
Name (4):	<input type="text"/>
Company:	<input type="text"/>
Address:	<input type="text"/>
Address(2):	<input type="text"/>
Address(3):	<input type="text"/>
State/Province:	<input type="text"/>
Zip/Postal Code:	<input type="text"/>
Country:	<input type="text"/>

Main Contact:	<input type="text"/>
Email:	<input type="text"/>
Phone:	<input type="text"/>

Comments/Notes to Registration Staff:

Registration Fees

Conference Fee:	\$2,500.00
x Number of Attendees:	1
Subtotal:	\$2,500.00
GST @ 10 %	\$250.00
Total Due:	\$2,750.00

All Funds are in AUD

Payments must be received within 5 days of registration application and no later than June 1, 2011.

Registration will be finalized upon receipt of payment.

Payment

Remit EFT Payment to:

TASS Asia Pacific (AP) Pty Ltd
Bank of America NA Sydney
Swift Code: BOFAAUSX
BSB number or Equivalent: 232 001
AUD Account Number: #15189010

(Please use Main Contact Name as EFT Reference)

Contact training@tassinc.com if you have any questions or concerns.