The University of New South Wales
School of Aviation

AVIA5313 – Aviation Ground Safety Investigation

2012 Course Outline

Course Staff

The course facilitator is Larry Doherty of the School of Aviation. Larry can be contacted via e-mail at larry.doherty@unsw.edu.au.

Larry Doherty is a Visiting Fellow in the School of Aviation and has spent more than twenty years in both military and civilian aviation. He is a safety specialist at Airservices Australia in Canberra. His past roles have included the Manager Investigations & Accident Response at Qantas Group Safety and accident investigator at the Australian Defence Forces Directorate of Flying Safety. Prior to this he spent ten years as an ADF pilot, mostly flying and instructing on Black Hawk helicopters. This included an exchange as a flying instructor with the US Army and a posting as the Senior Flying Instructor for Black Hawk training at the School of Army Aviation.

About the Author

Bryan Stott has worked for the Cathay Pacific Airways Safety Department and was formerly Manager, Safety Audit and Investigations for Qantas in 2001 where he was responsible for investigations both on the ground and in flight operations.

Previously he was an investigator with the Bureau of Air Safety Investigation (BASI), where he held various management positions, including a lengthy period acting as the Deputy Director. Whilst at BASI, he was Investigator In Charge (IIC) on a number of high profile accidents. Before joining BASI, Bryan served in the Royal Australian Air Force as a transport pilot.

Dr Graham Braithwaite is the Director of the Cranfield Safety and Accident Investigation Centre within the School of Engineering at Cranfield University in the UK. He graduated from Loughborough University in 1993 with a BSc (Hons) in Transport Management and Planning and again in 1998 with a PhD. in Aviation Safety. He was employed by UNSW as a Lecturer in Safety and Human Factors until 2003 and continues as a Visiting Senior Lecturer.

Graham has worked extensively with airline operators, regulators, manufacturers and national investigation agencies. As a result, he has developed close working links with the aviation industry both within Australia and overseas. He has presented a number of papers at international symposia published numerous journal papers and a book through Ashgate entitled Attitude or Latitude? Australian Aviation Safety.
Graham currently manages the accident investigation research and training programme at Cranfield University which includes the world-renowned 6-week Aircraft Accident Investigation course. He is also the Chairman of the Investigator Education and Training Working Group of the International Society of Air Safety Investigators and a Fellow of the Royal Aeronautical Society.

Course Information

*The sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability.*

*(ICAO Annex 13)*

Much of what is written about accident investigation in aviation has focused on *aircraft* accident investigation, a discipline that (rightly) remains focused upon accidents, which take place during flight. Training investigators to sift through wreckage trails that may be kilometres long or fathoms below the sea is a complex, multidisciplinary and expensive task. Technical courses that incorporate subjects such as metallurgy, acoustics, propulsion, crash dynamics and forensics are extremely interesting for the airline investigator, but an overkill for most people involved in the investigation of ‘normal’ airline events. These topics are essential for the representatives of the State regulator or national investigative agency (such as the ATSB, NTSB, AAIB), but are less directly relevant for airline investigators who, hopefully, will spend most of their investigative efforts on reactive incident investigations and proactive safety enhancements. Most airline investigators will not have the misfortune of becoming involved in the processes of a major accident investigation. Therefore, the need for training in the specific skills used in such an investigation is reduced. Hence, this occurrence level course was born.

No lectures or tutorials are provided as the course is only available as a distance learning course. However, the facilitator is available for discussion online or, with prior arrangement, on the phone or face-to-face.

The course is aimed at providing some of the skills needed of an airline investigator. It does not suggest that those who have not completed the course are incapable of investigating airline safety events. Neither does it guarantee that someone who has successfully completed the course will make a good investigator. It does, however, guide the student through a balanced range of issues that should be considered when investigating an event involving airline operations. Course content is derived from research and professional experience and offers the student a number of opportunities for further study or guidance.

Should investigators who have completed this course need or desire to extend their knowledge and learn some of the skills required of a major accident investigator, it would be a simple matter to complete shorter courses focussed on those investigation aspects. The skills learnt during this course are the fundamental building blocks that any aviation safety investigator would need to conduct a successful investigation in aviation safety.
William Tench, former head of the UK Accident Investigation Board described the job of the investigator as “...a fascinating challenge, occasionally exciting but always involving patient, even monotonous examination of every aspect of the accident – the tedium of which may erode those qualities of tenacity, imagination and perseverance which are fundamental to the effective investigator. Very important, too, is the need for a sympathetic appreciation of human behaviour under conditions of stress.” (Tench, 1985)

Richard Wood and Robert Sweginnis (1995) of the Southern California Safety Institute (SCSI) suggest that there are three basic attributes that describe all good investigators:

1. They are not afraid to be wrong. They will accept facts that are contrary to their present theory.
2. They readily admit that they don’t know everything. When they need help, they seek help.
3. They listen to other investigators. They don’t necessarily believe them, but they do listen to them.

By the end of this course, we can’t guarantee to have made you into a good investigator, but we hope to have given you some insight to what is required to become a good investigator and helped you along the way to develop those skills. A good investigator is made only partly from knowledge and experience; the rest comes down to attitude. Being an investigator can be incredibly frustrating and emotionally draining. The collection of evidence can be extremely difficult and it can feel like no one is on your side. The findings may not be well received and sometimes you could be 'shot for being the messenger'. However, the rewards can be significant, even if they are often invisible. An investigation that helps people learn and prevent future accidents may save a company millions of dollars or indeed hundred of lives. Of course, it is the nature of safety that means you will probably never know just how successful an investigation has been in improving safety.

Accident investigators are an unusual breed where the ultimate measure of success is their extinction.

Aims

- To provide an overview of the principles of safety, as relevant to ground safety investigation;
- To provide an overview of the principles of human factors, as relevant to ground safety investigation;
- To develop an understanding of the actions necessary to manage an accident scene such that an investigation can take place and the necessary agencies are notified and involved.
✈ To provide a sound academic basis for the collection of evidence including material evidence and interview data.

✈ To develop a sound approach towards the analysis and interpretation of evidence such that its presentation is both objective and valid.

✈ To identify areas of safety management that can benefit from ground safety investigation and can improve the safety of operations in the future.

**Learning Outcomes**

After completing this 3 UoC course, students should be able to:

✈ describe the principles and concepts discussed in the units;

✈ apply the principles and concepts to operational situations;

✈ demonstrate the ability to logically analyse the relevance of various pieces of evidence; and

✈ produce an assignment that considers systemic issues regarding safety in ground operations.

**Location**

This course runs for 6 week of Semester 1 & Semester 2.

The course is delivered electronically via UNSW Blackboard, on a distance-learning basis. The core component of delivery is the course manual. Course manuals are written by experts from various backgrounds within the aviation industry and a cross section of disciplines at UNSW. Each manual has been designed to guide the learner in the most effective and efficient way. As new concepts are introduced, practical exercises are provided so you can develop skills, which can be applied immediately in your workplace Students are able to study at their own pace, in accordance with their particular work schedules and locations. Academic review and feedback is delivered via e-mail.

**Learning and Teaching Philosophy**

This course aims to provide an academic environment in which students are actively engaged in the learning process. The course aims to be interesting, challenging and enjoyable. Activities are linked to both research and scholarship, and the real world, and allow students to reflect on how investigation issues affect them and others in the aviation industry. Student diversity in terms of experiences and learning styles is valued. A supportive environment is provided but there is an expectation that students will take responsibility for their own learning and also learn co-operatively.
with their peers. Student assessment is designed to reflect the learning outcomes, and meaningful and timely feedback will be provided on coursework.

**Integration into Overall Program**

The course links with several other courses offered as part of the MScTech in Aviation, that relate to human factors, organisational behaviour, risk and safety management, and aviation operations.

**Internet**

Online content and study materials can be accessed via UNSW Blackboard; http://telt.unsw.edu.au

**Course Schedule**

The course comprises of 6 units to match the course duration of 6 weeks.

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<tr>
<th>Unit</th>
<th>Title</th>
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<tr>
<td>Unit 1</td>
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<td>Unit 2</td>
<td>Principles of Human Factors</td>
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<td>Unit 3</td>
<td>Managing the Scene</td>
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<td>Unit 4</td>
<td>Investigation Techniques</td>
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<td>Unit 5</td>
<td>Investigative Analysis</td>
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<td>Unit 6</td>
<td>Proactive Safety Management</td>
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The six units are formulated around the preceding overview and are designed to build a well-rounded knowledge in the area. Whilst the body of knowledge in air safety investigation has historically been heavily oriented towards flight operations, special effort has been made to ensure that this course is generic as far as airline operations are concerned.

Unit one sets the scene for the course, concentrating on background information and fundamental issues of safety as they relate to operations within aviation. The aim of this knowledge is to establish a common foundation on which to build investigation techniques. Whilst some of this unit may be familiar to individual students, please take the opportunity to refresh your knowledge or to challenge some of the preconceptions you may have about safety.

Unit two introduces the principles of human factors. Human Factors is a major growth industry within aviation. This is of little surprise when 60-70% of aircraft accidents are shown to be directly as a result of human error and arguably 100% of accidents demonstrate some sort of human error as a contributory factor. James Reason’s organisational accident model is introduced – an essential component of any investigator’s tool kit.
Unit three tackles the practicalities of investigation, starting with preparations for an investigation, then notification and other aspects of managing the scene including dealing with the media, hazards for the investigator and the interface with other agencies.

Unit four considers investigation techniques including sources of evidence, recording and preservation of evidence, interview skills and Boards of Inquiry. Consideration is also given to research skills and avoiding bias on the part of the investigator.

Unit five moves onto the analysis stage of an investigation. Whilst this may be the less sexy end of the investigation it is probably the most important. Inaccurate or biased analysis of the evidence is worse than no analysis at all as the objectivity of an investigation is paramount. Informal and formal analysis methods are considered leading to coverage of reporting formats and the all-important recommendations.

Unit six covers an area that is rarely included in accident investigation courses; what happens next. Airline safety investigators rarely have the luxury of being just that. It is generally one of their many hats and hence we have included discussion of other safety tools that may be used in combination with investigation. These include quality assurance, audit, risk assessment and reporting systems. Safety culture and its role in airline safety is also covered.

The depth of this course aims to serve most airline investigators in their roles. However, each individual’s needs are different and further study may be required. As you progress through this course, please be aware of the other courses we offer that may be of value to you:

Aviation Human Factors
Aviation Safety and Accident Prevention
Aircraft Accident Investigation Techniques
Law and Regulations in Aviation
Aviation and Security
Aviation Safety Analysis and Research Methods
Aviation System Safety
Airline Corporate Management
Assessment

The MScTech (Aviation) Program’s approach to assessment closely follows that of the Australian Open Learning Program of the Australian Graduate School of Management. At all times assessment is intended to form a component of the learning process and assignments are designed to encourage you to apply what you learn to your own organization. Assignments will be assessed on the basis of how you apply course material to gaining new insight into your organization. Written comments will accompany your return assignments and exercises and should provide useful feedback. The examination will provide you and us with feedback about your comprehension of the course content.

Criteria for Assessment

Unless otherwise specified, the following criteria will be applied in assessing the Written essay:

- evidence of understanding of the concepts, theories and ideas developed in the course;
- ability to apply those concepts to situations from your own experience;
- capability to structure an assignment logically and limit it to the length required;
- the degree to which the material submitted for assessment addresses the specified or negotiated assignment requirements.
Academic Honesty and Plagiarism

Plagiarism is the presentation of the thoughts or work of another as one’s own\(^1\). Examples include:

- direct duplication of the thoughts or work of another, including by copying work, or knowingly permitting it to be copied. This includes copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person’s assignment without appropriate acknowledgement;
- paraphrasing another person’s work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor;
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.\(^2\)

Submitting an assessment item that has already been submitted for academic credit elsewhere may also be considered plagiarism.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

Students are reminded of their Rights and Responsibilities in respect of plagiarism, as set out in the University Undergraduate and Postgraduate Handbooks, and are encouraged to seek advice from academic staff whenever necessary to ensure they avoid plagiarism in all its forms.

The Learning Centre website is the central University online resource for staff and student information on plagiarism and academic honesty. It can be located at:

http://www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

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\(^1\) Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle.

\(^2\) Adapted with kind permission from the University of Melbourne.
Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

**Informal Feedback**

In addition to the formal assessment feedback, it is anticipated that informal feedback will be available to students throughout the semester. This will invariably take place through direct e-mail to the course facilitator or by Fax / Phone as appropriate.

Students are also encouraged to highlight any inaccuracies or errors within the manual so that future revision may be made. Whilst every effort is made to ensure accuracy, your comments are welcomed.

**Resources for students**

*Reference Texts*

There is no mandated textbook for this module as many readings have been included within each unit. This is to allow distance education to take place anywhere in the world at a reasonable cost and with equal access to resources. However, many students may wish to purchase additional texts to further their personal interest in this subject area. A few suggestions are listed below:


Internet

Significant resources are also available through the Internet. A number of links can be found through the UNSW Blackboard website:
www.telt.unsw.edu.au

Airservices Australia runs Australia’s premier aviation library in Canberra and is open to the general public on weekdays. Its catalogue is accessible on-line at:

Continual Course Improvement

Periodically, student evaluative feedback on the course is gathered, using among other means, UNSW's Course and Teaching Evaluation and Improvement (CATEI) Process. Student feedback is taken seriously, and continual improvements are made to the course based in part on such feedback. Significant changes to the course will be communicated to subsequent cohorts of students taking the course.

Teaching Strategies

The Master of Science and Technology in Aviation and its associated programs, the Graduate Certificate in Aviation Management and the Graduate Diploma in Aviation Management, are offered through distance education and have been specifically designed for students who are unable to attend weekly sessions at the university. The MScTech in Aviation is targeted towards professionals and managers who work in aviation related environments.

Administrative Matters

Students should be familiar with the information contained in https://my.unsw.edu.au regarding expectation of students, enrolment, fees and other policies that affect you. Also students must be familiar with the information provided in the Postgraduate Aviation Student Guide. This essential document can be obtained from the School of Aviation and is available on UNSW Blackboard. Please contact Jamie Lim at jamie.lim@unsw.edu.au for any administrative enquiries.