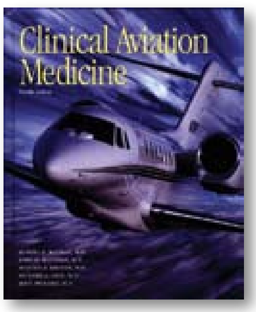
Fit to Fly?

The aviation medical examiner's knowledge must encompass both medicine and the particular conditions under which aviators work.



BOOKS

Clinical Aviation Medicine. Fourth Edition

Rayman, Russell B.; Hastings, John D.; Kruyer, William B.; Levy, Richard A.; Pickard, Jeb S. New York: Professional Publishing Group, 2006. 472 pp. References, index.

The aviation medical examiner (AME) must have, besides the general knowledge of any practitioner, good judgment about a crewmember's fitness to fly.

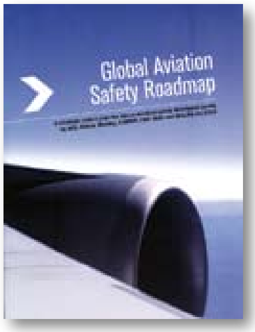
"In order to do so, it is necessary to have an understanding of the stresses of flight, aircraft operations, general medicine and the appropriate medical standards," says Dr. Rayman in his preface. "This book provides guidance to AMEs and flight surgeons, particularly inexperienced ones, who must determine aeromedical disposition, by discussing the more common disease entities and treatment modalities with particular emphasis on their significance in an aviation environment." (Dr. Rayman is a member of *Aviation Safety World*'s editorial advisory board.)

Aviators — the inclusive term used by the authors for all crewmembers — can no more be expected to be in perfect health throughout their careers than those in any line of work. "When a doctor, plumber or other laborer develops an infirmity, a decision is made as to whether the worker should remain on the job," the authors say. "However, with aviators, the nature of their profession necessitates exercising extreme caution when making such decisions. Although a pilot may become afflicted with an infirmity, this need not necessarily terminate his or her ability to fly. The essential question then becomes: Can the aviator afflicted with a disease continue to fly without jeopardizing health and compromising flying safety?"

Making such sometimes-delicate judgments is part of the AME's job, and is influenced by the standards of the regulatory organization. The authors say, "Although in previous decades medical standards tended more toward conservatism — 'it is better to err on the side of safety than sorrow' — that trend slowly and cautiously reversed direction and has since continued to this day toward more liberal ground. Although this policy shift is in a state of flux, it is certain that individual policies will differ among regulatory authorities."

Subcategories of medical significance exist even within aviation. "The stresses of flight, such as acceleration, vibration and noise, lowered barometric pressure, extremes of temperature and humidity, and fatigue, among others, vary considerably depending on the type of aviation operation," the authors say. "Therefore, medical standards for such widely disparate operations rightfully should be, and are indeed, very different."

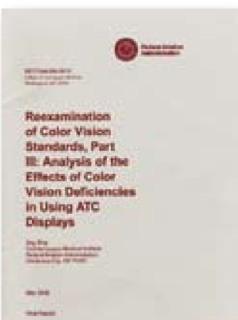
Chapters cover internal medicine, orthopedics, neurology, ophthalmology, otolaryngology,



cardiology, genitourinary, dermatology, psychiatry, oncology and therapeutic medications. Subchapters discuss specific ailments or topics under those headings, especially as they are related to flying. Pressure vertigo, for instance, is an occupational hazard in aviation caused by a sudden pressure increase in the middle ear, typically during climb and descent.

This new edition supersedes the previous one, published in 2000. References have been updated and new material added in areas such as multiple sclerosis, deep venous thrombosis, bleeding peptic ulcers, and others. The chapter titled "Therapeutic Medications in the Aviator," by Dr. Pickard, has been added to this edition and includes a subchapter on herbal medications.

REPORTS



Global Aviation Safety Roadmap

12 pp. Figure, photographs. Available via the Internet as a PDF copy from International Air Transport Association. Contact <ymqsafety@iata.org>.

The Global Aviation Safety Roadmap is a strategy being developed jointly for the International Civil Aviation Organization by Airbus, Airports Council International, The Boeing Co., the Civil Air Navigation Services Organisation, Flight Safety Foundation, the International Air Transport Association and the International Federation of Air Line Pilots' Associations. This document represents a preliminary outline of what the global strategy, or "Roadmap," is intended to accomplish; designates areas on which it will focus; and offers a tentative schedule for accomplishing near-term and medium-term goals.

The Roadmap's objective, the document says, "is to provide a common frame of reference for all stakeholders, including States, regulators, airline operators, airports, aircraft manufacturers, pilot associations, safety organizations and air traffic service providers."

The Roadmap is intended "to assist with the implementation of harmonized, consistent and coherent safety oversight regulations and processes, which properly reflect the global nature of modern air transportation. It highlights the need for State commitment to provide truly independent, adequately funded and effective civil aviation regulators. Moreover, the Roadmap looks to structured programs, which are effectively implemented in an 'open reporting' environment and a 'just culture' for the systematic collection, analysis and dissemination of safety reports and information that will be used solely for the prevention of accidents."

A pocket on the inside back cover contains a graphic presentation of the Global Aviation Safety Roadmap as a timeline divided among industry organizations, regional organizations and States, showing focus areas, and near-term and long-term goals. The text discusses the plan under headings such as metrics, risk measurement, the regional dimension and enablers for success.

Reexamination of Color Vision Standards, Part III: Analysis of the Effects of Color Vision Deficiencies in Using ATC Displays

Xing, Jing. U.S. Federal Aviation Administration (FAA) Office of Aerospace Medicine. DOT/FAA/AM-06/11. Final report. May 2006. 22 pp. Figures, references. Available via the Internet at <www.faa.gov/library/reports> or through the National Technical Information Service.*

This is the third in a series of reports analyzing color vision deficiencies in relation to current FAA air traffic control displays (*Aviation Safety World*, July 2006, page 63, and August 2006, page 56). In this report, analysis was performed for three primary displays and three supporting displays. For each display, the situations where color was used as a primary cue for attention or identification were determined. For those situations, non-color redundant cues, if any, were identified and their effectiveness was compared with colors. Using algorithms developed in Part II of the study, researchers computed the effectiveness of color for color-deficient controllers (CDs) compared with non-color-deficient controllers. If color was used in text on displays, the difference was also compared.

The main findings of the study were that "(1) Critical color-coded information may not capture the attention of CDs in many applications; (2) There are instances where CDs may not reliably identify types of information that are encoded in colors; and (3) In many instances, color use makes text reading slower and less accurate for CDs. These results indicate that CDs may not be able to use color displays as efficiently as users with normal vision." In addition, most non-color redundant cues were not as effective as color or not effective at all, the report says.

A Layman's Introduction to Human Factors in Aircraft Accident and Incident Investigation

Adams, David. Australian Transport Safety Bureau B2006/0094. Final report. June 2006. 33 pp. Available via the Internet at <www.atsb.gov.au/publications/2006/B20060094.aspx>.

This report is intended as a "plain English" discussion of its subject. "The purpose of applying human factors knowledge to [accident] investigations is not only to understand what happened in a given accident, but more importantly, why it happened," says Adams, a consultant.

"Some people believe that if a human is given a reasonable task to complete and [he or she is] adequately trained, then the individual should be able to repeatedly perform the task without error," Adams says. "However, applied research and accident investigation reports from around the world demonstrate that this view is incorrect. Competent humans conducting even simple tasks continually make errors, but in most cases they recognize the errors they have made and correct them before any consequence of the errors is realized. …

"It is believed by many human-science professionals that human error is a normal part of human performance and is related to the very qualities that make us human. That is, our brains allow us to quickly assess large amounts of information and make varying judgments and decisions about that information. However, our ability to vary our judgments and decisions is influenced by many factors, and these factors often lead us to make errors."

The report analyzes what typically is meant by the term *human factors* and describes the development of human factors research from the origin of powered flight to the present. As human factors understanding has become more sophisticated, Adams says, it has raised new problems. For instance, although fatigue is now recognized as a factor that can degrade pilot performance, it leaves no physical evidence. What role, if any, fatigue played in a fatal accident is often hard to determine. Investigators must still pursue such issues based on indirect evidence, Adams says, because we cannot afford to ignore them.

Human Factors Implications of Unmanned Aircraft Accidents: Flight-Control Problems

Williams, Kevin W. U.S. Federal Aviation Administration (FAA) Office of Aerospace Medicine. DOT/FAA/AM-06/8. Final report. April 2006. 9 pp. Figures, references. Available via the Internet at <www.faa.gov/library/reports> or through the National Technical Information Service.*

Unmanned aerial vehicles — more recently called "unmanned aircraft systems" — are proliferating (*Flight Safety Digest*, May 2005, page 1). According to this FAA report, unmanned aircraft "have suffered a disproportionately large number of mishaps relative to manned aircraft." The report presents the findings of a technical literature search on three types of flight control problems associated with unmanned aircraft systems: the external pilot's difficulty with counter-intuitive aspects of the needed control inputs; transferring control from one controlling system to another during flight; and automation of flight control.

Possible solutions for the first problem include designing the ground control station so that its "mapping" would always be consistent with aircraft movement, or eliminating the need for an external pilot through automation. Both present their own problems, the report says.

"The problem of transfer of control centers around the fact that the receiver of control is not always fully aware of the status of the system," the report says. "The problem can be solved by designing the displays in such a way that all critical system parameters are available to the pilot during the transfer."

Automation problems result when unanticipated circumstances lead to the system behaving as it was designed to, but not in the way that was expected. The report says possible solutions are of two kinds.

"The first is to design the system in a way that keeps the pilot more aware of what the aircraft is going to do during the flight," says the report. Such solutions, it adds, must counteract the "out-of-the-loop" syndrome in which humans working with automation have a diminished ability to detect system errors and respond by performing the task manually.

"The second solution to the automation problem is to design the automation to be more flexible so that, even when a particular contingency has not been anticipated, the system is still able to generate an appropriate response," the report says. "This is a challenge for those developing 'intelligent' systems, and this field is still in its infancy."

Static Sector Characteristics and Operational Errors

Goldman, Scott; Manning, Carol; Pfleiderer, Elaine. U.S. Federal Aviation Administration (FAA) Office of Aerospace Medicine. DOT/FAA/AM-06/4. Final report. March 2006. 15 pp. Figures, tables, references. Available via the Internet at <www.faa.gov/library/reports> or through the National Technical Information Service.*

In recent years, FAA has conducted a number of studies to identify factors associated with operational errors (OEs) at its air route traffic control centers (ARTCCs). This report describes preliminary analyses that used sector characteristics and OE data from the Indianapolis ARTCC. Data for the study were derived from a three-year sample of final OE reports and a set of static sector characteristics. Static sector characteristics, the only sector characteristics for Indianapolis Center available to the researchers in this study, are those that do not change according to the traffic situation. They include, for example, sector size, shape, number of miles of jetways and airways, and the number of major and minor airports.

"Altitude strata, sector size and number of major airports produced a regression model that accounted for 43 percent of the variance in sector OE incidence," the report said. "Sector altitude strata and sector size had a similar level of influence in the model, while the number of major airports was the least influential predictor. However, all three variables were significant predictors. Higher altitude sectors had more errors than lower altitude sectors (though super-high altitude sectors had fewer). Smaller sectors had more errors than larger sectors. Sectors with more major airports had more errors than those with fewer major airports."

Without additional data about dynamic, as well as static, sector characteristics and comparisons with other centers, the results have limited usefulness for recommendations, said the report.

WEB SITES

Airbus Safety Library, Flight Operations Briefing Notes, <www.airbus.com/en/corporate/ethics/safety_lib>

Flight Operations Briefing Notes, contained in the Safety Library section of the Airbus Web site, were developed by Airbus within the framework of the Flight Safety Foundation Approach-and-Landing Accident Reduction (ALAR) Task Force, reflecting conclusions and recommendations of the task force and the U.S. Commercial Aviation Safety Team (CAST), ALAR Joint Safety Implementation Team (JSIT).

"The Flight Operations Briefing Notes have been designed to allow an eye-opening and self-correcting accident prevention strategy," the introduction says. The information is posted as a reference for flight crewmembers, cabin crewmembers, flight operations personnel and others, regardless of their role, type of equipment and operation.

Briefing notes provide an overview of safety enhancements to "aircraft operations from gate to gate," Airbus says. Examples are operational and training standards, operating and flying techniques, threats and hazards awareness, and accident prevention strategies.

Currently, briefing notes appear under two headings: flight operations (which addresses several aspects, such as runway and surface operations) and cabin operations. Ramp operations notes and maintenance notes will be published in the future.

References to the FSF *ALAR Tool Kit* and *Flight Safety Digest* (August–November 2000) briefing notes on ALAR and approach-and-landing accidents are identified.

Briefing notes contain illustrations, statistics, color photographs, references and suggested reading material. Documents may be printed or downloaded to the user's computer.

European Aviation Safety Agency (EASA), <www.easa.eu.int/home/index.html>

Among its tasks, EASA establishes regulations and guidance on safety and type-certification of aircraft, engines and parts approved for operation within the European Union (EU) member states. It performs oversight and approval of aircraft maintenance organizations outside the EU.

EASA has assumed responsibility from the Joint Aviation Authorities (JAA) for Joint Aviation Requirements (JARs) pertaining to airworthiness and maintenance and converted them into EASA requirements. Currently, 16 JARs

have been converted to certification specifications (CSs) and posted, in English only, on line. To access them, click on the certification category at EASA's home page.

Each CS is identified with its new EASA designation and corresponding JAA name. All documents related to a specific CS are identified and may be viewed in full text, printed or downloaded to the user's computer at no cost. For example, CS-25, *Large Aeroplanes* (formerly JARs Part 25), contains the rule or main document, amendments, notices of proposed amendments, comments on the CS and EASA responses, explanatory notes and archived information. Additional tables show the status of European Technical Standard Orders and other CSs related to certification.

EASA refers researchers to a JAA Web site page, <www.jaa.nl/publications/changes_publications.html>, for information about JAA documents not affected by agency changes.●

Sources

* National Technical Information Service
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— *Rick Darby and Patricia Setze*