

TESTIMONY OF WILLIAM R. VOSS
PRESIDENT AND CEO, FLIGHT SAFETY FOUNDATION
UNITED STATES SENATE COMMITTEE ON COMMERCE, SCIENCE AND
TRANSPORTATION HEARING ON
AVIATION SAFETY: PILOT FATIGUE

DECEMBER 1, 2009

Chairman Rockefeller, Ranking Member Hutchison, and distinguished members of the Committee: My name is William Voss and I am the President and Chief Executive Officer of Flight Safety Foundation.

Flight Safety Foundation is an independent, nonprofit, international organization engaged in research, auditing, education, advocacy, and publishing. Its mission is to pursue the continuous improvement of global aviation safety and the prevention of accidents. We have members all around the world representing every facet of the aviation industry. On behalf of the Foundation, I appreciate your providing me this opportunity to testify about the important issue of fatigue, our views of the Federal Aviation Administration's (FAA) potential recommendations, and other recommendations from the Foundation.

The tragedy of the Colgan Air crash in Buffalo on Feb. 12, 2009, like so many other accidents, need not have happened. While we cannot bring back the victims of the Colgan Air crash, we can honor their lives by using the knowledge we gained during this investigation to revamp how we deal with fatigue management. We are pleased to see the FAA and industry—with management working well with labor—addressing this issue as a high priority, and pledging to apply the science we know to bring about very soon practical and needed reforms.

My background in aviation is diverse. I've been a pilot, an air traffic controller, a certified aviation mechanic, and a regulator and standard-setter, both at the FAA and the International Civil Aviation Organization (ICAO). I know firsthand how the issue of fatigue can affect every aspect of this industry. We all know that fatigue affects our performance, but normally our own drowsiness or lack of sleep does not have catastrophic consequences.

Fatigue Risk Management Systems – The Preferred Approach

To cut to the chase, we recommend that civil aviation authorities immediately adopt effective fatigue risk management systems (FRMS).

FRMS is a proactive approach to addressing fatigue in a systematic, comprehensive manner that does not rely solely on adherence to a set of prescribed hourly limits of duty and required time off. Instead, it decreases the role of the regulator and increases the responsibility of the operator and its employees to jointly manage the risk. In its broadest interpretation, FRMS takes a systematic, three-pronged, incremental approach to managing fatigue risk:

- **Prevention** — This fundamental first step can be characterized as proactive strategic risk prevention. It includes such measures as scientifically defensible scheduling, suitable hotels for sleep, crew augmentation, and education and training about sleep hygiene and fatigue. We believe that this step should also include medical identification and treatment of sleep disorders, such as sleep apnea, which are known to increase with aging; however, the FAA's annual medical examination for air transport pilots (FAA Form 8500-8; Application Process and Examination Techniques) has no requirement to identify possible sleep disorders.
- **Mitigation** — This second step encompasses risk mitigation at the operational level. It includes such measures as responsible trip planning, including pre-trip rest and commuting if necessary, crew rest facilities (both at the airport and in flight for augmented crews), meal planning, anticipation of irregular operational events, and crew resource management (CRM) training that addresses fatigue effects on crew performance.
- **Intervention** — This final step recognizes the inevitable fact that crews sometimes experience significant fatigue despite their and the operator's best efforts to prevent it. It includes those actions that can be invoked to manage the risk until the flight is safely concluded. This intervention can include tailored procedural guidelines, enhanced CRM, timely intake of caffeine, and controlled rest on the flight deck.

An FRMS's comprehensive range of safeguards is designed to control the risk associated with both transient and cumulative fatigue. FRMS is data-driven, monitoring situations in which fatigue risk occurs and in which safety may be jeopardized. It then allows for generating new scheduling solutions or other strategies to mitigate measured fatigue risk. At the same time, FRMS provides operators with flexibility to seek the most efficient safe crewing solutions to meet operational needs.

An FRMS enhances the capability of prescriptive flight-time limitation concepts to provide an equivalent or enhanced level of safety based on the identification and management of fatigue risk relevant to the specific circumstances. Use of an FRMS can allow greater operational flexibility and efficiency while maintaining safety by relying on in-flight measurements of sleep and alertness, including subjective reports by crewmembers, to monitor how scheduling affects flight crew and cabin crew alertness during flight duty.

Fatigue Management – Abundant Study, Not Enough Action

Flight Safety Foundation has worked on this issue for many years, including creating the Ultra-Long Range (ULR) Crew Alertness Steering Committee, which in 2005 published guidance for conducting flights that last 16 hours or more, and the Fatigue Countermeasures Task Force, which created the Principles and Guidelines for Duty and Rest Scheduling in Corporate and Business Aviation in 1997. In addition to these task forces, Flight Safety Foundation has written about the issue of fatigue extensively in our publication, *AeroSafety World*, as well as in older Foundation publications.

The problem of fatigue in aviation has been highlighted in the headlines over the past year, but it is an issue that has been the target of decades of scientific research. In 1979, the National Aeronautics and Space Administration (NASA) undertook the first study to examine the effects of fatigue on decision making in an aircraft simulator. Shortly after that, Congress directed NASA to undertake a multi-year study to understand the impact of crew fatigue and jet lag. This led to a collaborative study with laboratories in the United Kingdom, the Federal Republic of Germany, and Japan and produced some outstanding results.

Federal Aviation Administration Actions

We are supportive of FAA efforts to establish new rules that reflect a much better scientific understanding of fatigue. With the announcement on November 24, 2009 of the withdrawal of the Notice of Proposed Rulemaking from 1995, we anticipate that new rules will be proposed soon. The industry and regulators have been studying fatigue for many years, and there has been gradual progress in finding a consensus.

In writing this new rule, the FAA is faced with a daunting task. Quite simply, human fatigue is too complex a subject to be dealt with using the classic approach of regulations and compliance. To deal with the problem of fatigue risk effectively, it is necessary to implement a comprehensive fatigue risk management system. Many major operators

will do this, but it is unrealistic to think that every operator is going to take such a sophisticated approach. For that reason, the FAA will have to write a rule that has imperfect, but improved, prescriptive provisions, but also encourages the use of fatigue risk management systems where appropriate.

At a minimum, these prescriptive provisions within the new regulation should address the relationship between assigned duty and the time of day, the cumulative fatigue effects of consecutive duty periods, and the effect of multiple short flights during the duty day. These provisions will not be perfect, but for smaller operators, simplicity is more important than perfection.

Another challenge the FAA will face is the fact that the fatigue research, while extensive, is somewhat uneven. A great deal of research has been done on the effects of ultra-long range flights, but relatively little research has been done into the fatiguing effect of frequent short flights. The FAA will have to find a way to put a regulation in place quickly, while allowing for adjustments as new information becomes available.

Global Examples—Useful Examples

Several airlines and civil aviation authorities have adopted FRMS. One of the first airlines was easyJet, which began the system as a research program to gather data on pilots' sleep and fatigue-related performance. The research effort yielded revised work schedules, continuing data collection and more information on fatigue risks, a procedure for crewmembers to report fatigue within a just culture, and a process for investigating the role of fatigue in all incidents. This is a process that could be easily replicated and should be a part of any FAA proposed rulemaking.

An FRMS is easily integrated into any safety management system (SMS). This is the approach taken by Transport Canada. An FRMS is one element of an SMS, while the just culture and non-punitive safety reporting that are called for in FRMS are integral parts of SMS. Flight Safety Foundation has publicly stated its support for Transport Canada's embrace of safety management systems.

Canada is one of many countries that have determined that safety is best served by allowing – and regulating – controlled napping in the cockpit. This is a position that Flight Safety Foundation heartily endorses and calls on the FAA to do the same. Of course, controlled napping must never take the place of a good night's sleep and sensible, scientifically defensible scheduling. But on occasion, a pilot may unexpectedly feel

extra-fatigued due to conditions out of his or her control. In that case, it is far safer to have a procedure in place to allow the fatigued pilot to sleep for a prescribed amount of time with the full knowledge of the co-pilot and the rest of the flight crew. The regulations developed by Canada outline a procedure that takes into account all possible variables and leads to safer operations. It includes requirements covering how napping shall be undertaken, what happens during crew rest, and who is responsible for various actions as well as a post-rest briefing.

The idea of controlled rest in the United States is, unfortunately, colored by well-publicized episodes of uncontrolled rest. We hope that the FAA will consider the science and the successful experiences in many other countries to guide them on this aspect of FRMS, rather than alarmist concerns from individuals who have not studied this issue. Many countries and airlines allow for controlled napping, including France, Australia, Singapore and Canada. The aviation safety records of those countries speak for themselves.

The Foundation also urges the FAA to capitalize on its June 2008 fatigue management symposium and its ULR experience to further develop and implement FRMS on a trial basis within the context of current prescriptive flight-time limitations. As in other countries, close cooperation and support among airline management, pilot organizations and regulators will be critical to achieving success. In addition, since ICAO is the appropriate body to establish mutually acceptable worldwide standards and recommended practices for FRMS, the Foundation strongly encourages the FAA's continued participation in and support of ICAO's efforts to use FRMS as an alternative to flight- and duty-time limits.

Other Fatigue Issues

We focus so much on the performance of pilots and possibly the rest of the flight crew, we often overlook the rest of the industry when we think about fatigue. Last year, *AeroSafety World* published a long article about the dangers of fatigue in aviation maintenance workers (April 2008). This has also been an issue examined by the ICAO, which cited several accidents in which fatigue on the part of maintenance workers was a contributing factor.

North of our border, the Canadians are working on initiatives to incorporate FRMS for both flight crews and maintenance personnel as a mandatory portion of an operator's SMS. Australia is also moving towards implementation of FRMS in aviation maintenance.

Flight Safety Foundation strongly urges the FAA to include maintenance personnel in its proposed rules addressing fatigue.

Another area that calls for more research is that of high-frequency/high-cycle operations. An eight-hour work day means two different things for the ultra-long range operator and the regional operator. Multiple take offs and landings over that time period can lead to a higher level of fatigue due to the higher work load activities. We understand the Regional Airline Association has committed to lead new studies to examine the relationship between these types of operations and fatigue. Flight Safety Foundation strongly supports those efforts and calls on the FAA to include these research findings in the proposed rules. Broadening the research into the short-haul flights is also a recommendation of the National Transportation Safety Board (NTSB).

In addition to the recommendation on increased research on short-haul flights, the NTSB has issued recommendations that address the issue of undiagnosed sleep apnea and other sleep disorders. The FAA's current guidance to aviation medical examiners does not include a discussion of risk factors for sleep apnea, nor does the application for an airman's medical certificate ask if there is a history. According to the NTSB, other federal agencies overseeing other forms of passenger transportation already gather this sort of information or are in the process of revising forms and guidance in order to do so.

Finally, a concerted effort should be made by the FAA, industry and labor to educate the aviation safety workforce on matters associated with fatigue risk. This doesn't require regulatory action, and would have a significant positive effect in the near term. We can start putting tools into the hands of those people who could make a difference, including managers, schedulers, pilots, flight attendants, maintenance technicians, and others. Countless operators are in the process of developing fatigue training materials for their workforce. If we pooled these efforts, we could do much more, and do it quickly. Just as regulators, labor and industry came together 20 years ago to deal with the problem of controlled flight into terrain, we can come together again to deal with this threat. The Flight Safety Foundation is working with the Regional Airline Association and others to try to make that happen.

The United States should be leading the world on fatigue management as it has led the world on so many advances in aviation safety. Civil aviation authorities all around the world are using the research undertaken by NASA and ICAO to mitigate the risk that comes from a fatigued aviation work force. The time is now for the FAA, the operators, management, and labor to come together and develop a consensus on this

vital issue. I'm personally gratified by the level of cooperation we are seeing and I'm hopeful that the FAA's proposed rules will meet the challenges of being scientifically based and inclusive of all the latest research and experiences.

Thank you very much for the opportunity to testify today. I would be pleased to answer any questions.