

Focus on: The Sleep/Wake Research Centre, Massey University, New Zealand

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This month's President's Page will focus on the Sleep/Wake Research Centre. Our thanks to Professor Philippa Gander for her excellent contribution.

The Sleep/Wake Research Centre (SWRC) was founded in Wellington, New Zealand, by Professor Philippa Gander in 1998 and has been at Massey University since 2003. The Centre is fully externally funded and has a range of research activities across four main portfolios: basic sleep and circadian science; healthy sleep across the life span; applied research in the built environment; and applied fatigue and shift work management, with aviation being their main focus in this portfolio.

Philippa's interest in aviation came from her years as a principle investigator in the NASA Ames Fatigue and Jet Lag Program (now the Fatigue Countermeasures Program), which she joined in 1983. Associate Professor Leigh Signal, who now leads the SWRC Aviation Research Team, trained as a commercial pilot and was an early Ph.D. graduate from the Centre with a prize-winning thesis on napping in air traffic control. Many excellent researchers from a variety of backgrounds have contributed to the team over the years.

The core scientific disciplines at SWRC—sleep and the circadian timekeeping system—are fundamental to fatigue risk management in aviation. ICAO recognizes sleep loss and working and sleeping at suboptimal circadian times as major causes of fatigue-related impairment across aviation operations. As professional scientists, the SWRC Team adheres to the principles of including workforce and other necessary expertise in all phases of research, independent ethical review, and publication of findings in the peer-reviewed scientific literature whenever possible in order to expand the scientific knowledge base for fatigue risk management. They work on the premise that the integration of regulatory, operational (management and workforce), and scientific expertise is required to develop safe and acceptable solutions for fatigue risk management.

The SWRC Team has been the scientific partner in many field studies monitoring fatigue and sleep, mostly with flight crew, but also with cabin crew, helicopter pilots, air traffic controllers, and aircraft maintenance engineers. These include Ultra-Long Range (ULR) validation studies for four airlines on four continents, starting with the first commercial ULR operation by Singapore Airlines. Over a 12-year collaboration with Delta Air Lines, they have carried out monitoring studies on a wide range of long-haul aircraft and trip patterns, including validation studies for different crew bunk configurations. They have also carried out studies for Boeing on crew sleep and fatigue during aircraft delivery flights

and in hypobaric chambers, investigating the effects of cabin pressure altitudes on sleep.

While each airline study addresses specific operational concerns, in combination they provide an extraordinary resource that has enabled the SWRC Team to advance scientific knowledge and fatigue risk management. The Centre now holds a combined database of studies of four-pilot long haul operations from four airlines based on three continents, to which ongoing studies will be added. This has enabled statistical analyses that separate out the effects on pilot fatigue of physiological factors (sleep history and the circadian timekeeping system) vs. operational factors (flight timing, direction, and duration). The database also makes it possible to compare agreed safety performance indicators (for example, total in-flight sleep, psychomotor vigilance task response speed, fatigue, and sleepiness ratings) between established and new operations. This is valuable for building safety cases that airlines submit to their national regulators to gain approval for new operations that fall outside the prescriptive regulatory requirements, as well as for benchmarking their existing operations.

In addition to the quantitative data collected in the airline monitoring studies, crewmembers are invited to provide written comments, and a recent survey explored fatigue risk management issues raised by crewmembers across all Delta fleets. Hearing the crewmembers' views is essential for effective fatigue risk management because they have direct experience of the operational risks and share responsibility for managing them.

More recently, members of the SWRC Team have worked with helicopter and small aviation operators to refine fatigue risk management system processes for their specific needs. Team members also have extensive experience in consulting with national regulators, air carriers, unions, and accident investigation agencies, as well as providing legal expert testimony. Philippa served on the ICAO Fatigue Risk Management Taskforce that developed the new regulatory framework for fatigue risk management and she led the writing team for both editions of the joint IATA/ICAO/IFALPA Fatigue Management Guide for Airline Operators. Leigh serves on ICAO Taskforces that are establishing prescriptive work and rest rules and developing guidance material on fatigue risk management for helicopter operations and air traffic control.



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Dr. Margo van den Berg is leading a research portfolio on fatigue risk management for cabin crew and Dr. Jenn Zaslona has a particular focus on qualitative research exploring flight crewmembers' views around fatigue risk management.

PILOT DEPRESSION AND COVID-19

Depression has increased as a result of the COVID-19 pandemic. A recent survey in the United States by researchers from Northeastern, Harvard, Northwestern, and Rutgers Universities shows that more than a quarter of residents describe symptoms consistent with moderate or severe depression. This is more than three times higher than what has normally been observed.

According to the International Air Transport Association, a return to normal could take up to 5 years and as many as 25 million aviation jobs worldwide could be lost due to the pandemic. The prevalence of depression experienced by commercial airline pilots has already been reported to be from 1.9% to 12.6%.

During this time, when depression is more prevalent due to the pandemic, it falls on aviation medical examiners (AMEs) to detect when pilots need additional attention due to potential

mental health problems. Question 18 on FAA Form 8500-8 requires the pilot to report if they have been diagnosed with, had, or have a mental disorder of any sort, including depression, anxiety, or a suicide attempt; however, there may be a strong disincentive for pilots to accurately report if they are suffering from depressive symptoms, as this could negatively impact their ability to get medically certified.

While an AME is not expected to perform a formal psychiatric examination, the examiner should form a general impression of the emotional stability and mental state of an applicant. This can best be accomplished by closely observing the general appearance, behaviour, mood, communication skills, and memory of the applicant, and asking a lot of follow-up questions during the exam. It falls on the AME to engage with the pilot through conversation to elicit details that may have been intentionally or accidentally omitted on the application for certification. The role of the AME to skilfully draw out information critical to the assessment of pilot mental health has perhaps never been as important as it is during these trying times when so many pilots have been under so much stress for so long.