

Rest *in* Place

BY LINDA WERFELMAN,
CLARENCE E. RASH AND
SHARON D. MANNING

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Some aviation officials and aeromedical specialists recommend controlled napping to help keep pilots alert; others say naps aren't the answer.

Controlled in-seat napping on the flight deck has been recommended for years as one element of an effective plan to help pilots ward off fatigue. Most recently, the Aerospace Medical Association (AsMA) said that the aviation industry should end its prohibition against in-seat napping — a practice the organization characterizes as a safe and effective risk-management tool that could greatly improve pilot alertness.¹

“Taking a nap when it is convenient is better than trying to stay alert and productive for hours on end without sleep,” says J. Lynn Caldwell, a crew rest expert at the U.S. Air Force Research Laboratory and a member of the AsMA fatigue countermeasures subcommittee, which drafted the recommendations endorsed in 2009 by the organization. “A nap can make a noticeable difference in performance, alertness and mood.”

Although in-seat napping is sanctioned by some civil aviation authorities — only in accordance with guidelines to ensure operational safety — and used by the pilots of some international air carriers, not everyone considers napping a solution to the fatigue problem.

For example, the U.S. Federal Aviation Administration (FAA) does not permit napping by on-duty flight crewmembers. An upcoming revision of the agency’s rules for pilot rest will not change that policy, says Margaret Gilligan, FAA associate administrator for aviation safety.

“The crew needs to come to work prepared for the schedule that they are

undertaking,” Gilligan said during a December 2009 hearing on pilot fatigue before the aviation subcommittee of the U.S. Senate Committee on Commerce, Science and Transportation. “We believe that we can manage and mitigate their fatigue through the new regulations sufficiently that they should be alert throughout the flight.”

John Prater, president of the Air Line Pilots Association, International (ALPA), told the subcommittee that napping should only be used as a “last-ditch effort” to help pilots stay alert during critical phases of flight.

Prater said, however, that he fears that sanctioned napping could become a means for “somehow keeping pilots on duty even longer.”

He said he envisions conversations in which a pilot tells a scheduler that he or she must decline a flight because of fatigue, and the scheduler responds, “Don’t worry — you can catch a nap en route.”

“That’s not a sound strategy for being alert on the other end,” Prater said.

Supporters of controlled napping, including Flight Safety Foundation President and CEO William R. Voss, told the subcommittee that an in-seat nap would be



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‘It’s ... a smarter approach than to run the risk of both pilots falling asleep.’

“an exception, not the rule,” a tactic to be used as “one last layer of defense” against crew fatigue.

This “last layer,” which also includes such fatigue countermeasures as the “timely intake” of caffeine, “recognizes the inevitable fact that crews sometimes experience significant fatigue despite their — and the operator’s — best efforts to prevent it,” Voss said. “It includes those actions that can be invoked to manage the risk until the flight is safely concluded.”

Basil J. Barimo, Air Transport Association of America vice president of operations and safety, agreed, calling on the FAA to endorse controlled cockpit napping “conducted in accordance with FAA-approved procedures to facilitate alertness during the critical phases of flight.”

“We don’t view napping as a silver bullet for fatigue,” Barimo said. “Airlines would not build schedules that incorporate napping as a requirement to complete a trip. ... It’s a way to manage fatigue as it arises on a real-time basis — a smarter approach ... than to run the risk of both pilots falling asleep.”

Controlled napping should be one of the fatigue-fighting tools incorporated into the FAA’s new rules, Barimo said, citing studies showing that scheduled in-flight naps can improve alertness and performance, especially when pilots do not obtain the recommended eight hours of sleep in each 24-hour period.

NASA Research

One such study, conducted in 1994 by the U.S. National Aeronautics and Space Administration (NASA), divided 21 participating pilots — each a member of a three-person flight crew — into a “rest” group whose members were allowed a 40-minute controlled rest period during the cruise portion of flight and a “no-rest” group whose members continued their usual flight activities during that 40-minute period.²

Pilots in the rest group typically fell asleep quickly, slept “efficiently” for an average of

26 minutes and, after awakening, displayed “improved physiological alertness and performance,” compared with colleagues in the no-rest group, according to the researchers’ report.

“The benefits of the nap were observed through the critical descent and landing phases of flight,” the report said. “The nap did not affect layover sleep or the cumulative sleep debt displayed by the majority of crewmembers. The nap procedures were implemented with minimal disruption to usual flight operations, and there were no reported or identified concerns regarding safety.”

The NASA sleep researchers and others believe that properly planned napping strategies can be effective against fatigue, preventing many of the attention lapses and microsleeps — periods of sleep that last only several seconds and often are not recognized — encountered during long-range flight operations.

In addition to its benefits, napping also has a negative aspect. “Practically everyone,” Caldwell said, “experiences post-nap grogginess.”

This grogginess also is referred to as “sleep inertia,” which manifests itself in degraded vigilance, increased drowsiness and diminished performance³ for one to 35 minutes after awakening.⁴

Sleep inertia is an important consideration in the scheduling of cockpit naps, sleep researchers have said. ALPA’s Prater agreed, adding, “Trying to come up out of a nap to make a snap decision ... is difficult.”

Those who favor in-seat napping agree that planning must take into consideration several factors. AsMA’s recommendations call for no more than 40 minutes to be set aside for an on-duty, in-seat nap. The time limit was derived from the NASA studies and other sleep research that has shown that a sleep period of less than 30 minutes is less likely to be followed by excessive sleep inertia.

In the 1994 NASA study, only 8 percent of participants entered “slow-wave sleep” — also called deep sleep or non-rapid eye movement (NREM) sleep — the stage of sleep conducive to

subsequent sleep inertia. NREM sleep typically begins about 30 minutes after a person falls asleep; REM sleep, the stage of sleep associated with dreaming, typically begins 60 to 100 minutes after the start of a regular eight-hour sleep period.⁵

When a pilot is planning an off-duty nap, however, the strategies differ. An off-duty nap should be scheduled in proper relation to the sleep loss period and the natural circadian rhythm. Also, most studies indicate that a nap of at least one hour improves performance and alertness; as might be expected, the longer the nap length, the better. Finally, the quality of the nap is determined by the amount of time spent in deep sleep.⁶

No Adverse Effects

A number of international carriers, including Air Canada, Air New Zealand, British Airways, Emirates and Qantas, allow one pilot to nap in his or her seat during routine cruise segments of long-range flights. The 2009 AsMA report said that these naps have been taken “without producing adverse effects.”⁷

The AsMA report also cited a 1999 NASA report on a survey of U.S. commercial pilots, noting that, despite the FAA’s prohibition, 56 percent of flight crewmembers who responded to a regional airline operations survey said they had been on a flight during which one pilot arranged to sleep in the cockpit.⁸ Of those pilots responding to a related corporate/executive pilot survey, 39 percent said that they had been on flights in which similar arrangements were made, according to a 2001 NASA report.⁹

Several years earlier, in a 1991 NASA study of long-range flight crews, pilots were observed napping 11 percent of the available time, with naps that lasted an average of 46 minutes.¹⁰

In addition, the AsMA report cited a 2002 opinion poll conducted by the U.S. National Sleep Foundation, in which 86 percent of respondents said that they completely or mostly agree with this statement: “An airline pilot who becomes drowsy while flying should be allowed



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to take a nap if another qualified pilot is awake and can take over during the nap.”¹¹

Nevertheless, Voss noted in his testimony that in the United States, “the idea of controlled rest in the cockpit is unfortunately colored by well-publicized episodes of uncontrolled rest.” He referred, in part, to a February 2008 incident in which a go! Airlines Bombardier CL-600-2B19 overflew its destination in Hilo, Hawaii, because both pilots had unintentionally fallen asleep (ASW, 9/09, p. 24). The pilots awakened and returned to Hilo for an uneventful landing. The U.S. National Transportation Safety Board said the timing of the incident in the mid-morning was an indication that the pilots were fatigued.

“We hope that the FAA will consider the science and the successful experiences in many other countries to guide them ... rather than alarmist concerns from individuals who

have not studied this issue,” said Voss, although he acknowledged that the idea of planning a nap for a pilot might seem “counterintuitive to folks in the back of the plane.

“Many countries and airlines allow for controlled napping, including France, Australia, Singapore and Canada. The aviation safety records of those countries speak for themselves,” he said.

Canadian Aviation Regulations (CARs) Part 720.23, “Controlled Rest on the Flight Deck,” spells out the requirements for Canadian operators whose pilots participate in in-seat napping programs. Training in general principles of fatigue and fatigue countermeasures is required, along with training in the specifics of the operator’s program.

According to the CARs, rest periods are planned during a pre-flight briefing “to enable them to anticipate and maximize the sleep opportunity and to manage their alertness”; sometimes, however, the briefing may be conducted during the flight. A five-minute “pre-rest period” is designated for transfer of duties, an operational briefing and coordination with flight attendants before the rest period begins. The rest period itself is limited to 45 minutes during the cruise phase of flight and must be completed at least 30 minutes before beginning the descent. A “post-rest period” of at least 15 minutes with no flight duties is provided after the crewmember awakens “to allow sufficient time to become fully awake before resuming normal duties.”

The Canadian procedure “takes into account all possible variables and leads to safer operations,” Voss said.

After all, he added, “If a pilot unexpectedly is extra-fatigued, 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 copilot and the rest of the crew.”

Clarence E. Rash is a research physicist with 30 years experience in military aviation research and development. He has authored more than 200 papers on aviation display, human factors and protection topics.

Sharon D. Manning is Garrison Safety and Occupational Health Director at the Aviation Branch Safety Office (ABSO), Fort Rucker, Alabama, U.S. She has 15 years experience in Army aviation and privately owned vehicle safety.

Notes

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