A LINE ON LIFE 2/16/97 Has Your Pilot Had His Nap? *

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On your next flight, I'm sure you want your pilot to be alert. You don't want him (or her) to fall "asleep at the wheel." Pilots are often fatigued, especially when they fly at night or across time zones. Fatigue causes mistakes. In turn, these mistakes can cause accidents or "close-calls." To avoid this, recent psychological studies recommend that pilots take scheduled naps on the job.



Psychologist Mark Rosekind (National Aeronautics and Space Administration, NASA) headed up a research group known as the "Z" Team (as in "Zzzzz" to represent snoring). Previous NASA studies indicate that pilots already take naps, especially when they are **sleep deprived** or experience **jet lag**. (Jet lag commonly occurs as travelers cross time zones. Their circadian [meaning "*about a day*"] rhythms of waking and sleeping do not match those needed for the new time

zone.) Whether they are planned or spontaneous, naps already do occur. In one study of 29 flight crew members, when conditions permitted, three of these crew members napped for an average of 46 minutes.

In the current study, Rosekind's team wired flight crew members to measure *brain waves* and *eye movements*. Particular types of brain waves – alpha or theta – indicate that people are sleepy. Slower eye movements are also associated with sleepiness. For ten-minute intervals during flights, they were also given a *reaction-time task*. Pilots are asked to hit a button every time that a light flashed on a screen. Anyone can do well for the first minute. After three minutes, if a person is fatigued, performance levels start to drop. After eight minutes, it will be clear if a person is sleep deprived.

In this napping experiment, the research team selected seven three-man crews. Each was flying eight 9hour flights across the Pacific over 12 days. There was a 25-hour layover between each flight. Flight crews were measured on the middle four of these eight flights to collect the research data.

Crew members were randomly assigned to a "*rest*" condition or a "*no-rest*" condition. Those in the "*rest*" group were told to take a 40-minute rest, when the workload was low. The other group was assigned similar periods, but they were told to continue their regular flight activities. (At all times, at least two crew members were engaged in flying the plane.)

In the rest condition, 93% of the time, the pilots fell asleep. After an average of 5.6 minutes, they slept for about 26 minutes. (Previous lab studies found that well-rested people take about 20 minutes to fall asleep. In contrast, sleep-deprived people take 5 minutes or less.)

The naps made a significant difference. With the "*rest*" group, performance on the reaction-time task never lapsed. Pilots did just as well in the beginning, middle and end of each flight. They performed as well from the third flight to the sixth flight, either night or day.

As measured by brain waves and eye movements, all pilots showed some fatigue in the final 90 minutes of the each flight. However, the "*no-rest*" group showed twice as many sleepy episodes. In fact, even though they knew they were being observed, 5 of the 9 pilots in the "*no-rest*" group fell asleep during the control period. This study demonstrated that a 40-minute rest can combat fatigue and improves performance at the end of long flights.

"There's a physiological wall created by sleepiness, and when your brain hits that wall it puts you to sleep."

Based on this research, the Federal Aviation Administration (FAA) is reviewing rules that would permit napping. Eight international airlines – including Swissair, Finnair and Quantus – have already implemented planned cockpit rest periods. However, this does not guarantee that fatigue will not affect future flights. Other factors need to be examined – how many hours a pilot is working, the time changes encountered, and the individual sleep patterns of individual pilots.

This and similar research can also be applied to other areas. It can cross over into other occupations that require 24-hour service – medicine and law enforcement. Rosekind and his associates have applied their research to a one-hour training seminar. It discusses sleep, circadian rhythms, and methods for resisting fatigue. So far, this seminar has been given to over 75,000 flight-crew members. This does not include medical, law enforcement and customs personnel who have also received this information.

The FAA is using this and other research to update its regulations about flight times and rest periods. The FAA regulations have been basically unchanged since 1937. This makes Rosekind and his associates feel pleased.

"It's been very satisfying to be in an environment where I can do basic psychological research and see it used to make things better in the real world."

I know when I have been correcting papers for a long time, a 30-minute nap refreshes me. (Sometimes I wake up to realize that I have taken an unplanned nap.) Either way, a nap allows me to continue to function at a higher level with tasks that require concentration.

If you have been deprived of sleep, a short nap might help you too. (However, you could wait until you are done reading this article.)

* Adapted from Beth Azar's "Naps lead to safer piloting, study shows," and "New study tool fits into carryon luggage," *The APA Monitor*, May, 1996, page 22.