

BY THOMAS ANTHONY

# Wake Me

On the “rattler” shift, it’s a toss-up who will crash first.

# When My Shift Is Over

“The rattler” is the nickname for a work schedule used in U.S. air traffic control (ATC) facilities. I used to work the rattler shift as a controller in the 1980s. I learned that this shift earned its reputation for doubling back and biting those who worked it.

My first reaction to learning about the rattler shift was, “Does anybody know we are doing this?” I figured the answer had to be “no,” since no one would intentionally schedule a controller to work live traffic with only three or four hours of sleep. I found out I was wrong. Not only was it done intentionally, but it occurred regularly in

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facilities around the Federal Aviation Administration (FAA) ATC system. Imagine my reaction after reading about the Comair Flight 5191 accident at Lexington, Kentucky — they're *still* working the rattler.

The idea behind the rattler is to compress your five eight-hour shifts closely together to maximize the time in your days off. Here is how it works: The first day of your workweek — we'll

between a day shift and a midnight shift (mid). Two hours of sleep is not an anomaly when working the mid; it is a normal fact of life. The media failed to ask *why* the controller only got two hours.

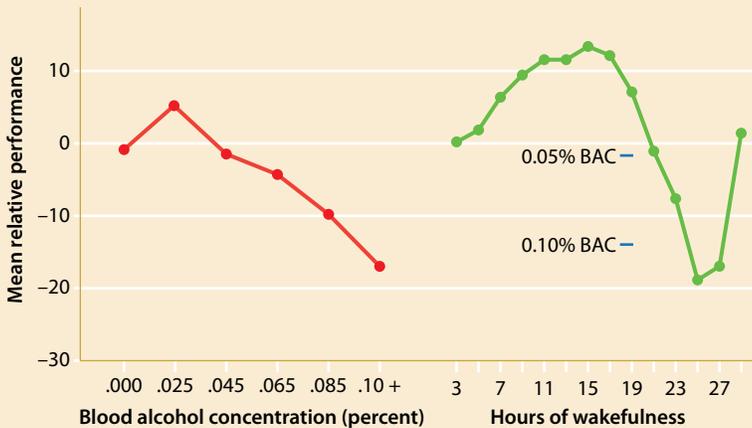
At the University of Southern California Aviation Safety and Security Program, among the topics we cover is human factors that contribute to aircraft accidents. In one course, Flight Surgeon Gregg Bendrick of the U.S. National Aeronautics and Space Administration (NASA) Dryden Flight Research Center presents the science behind the decrease in function associated with sleep loss and fatigue. This includes loss of focus, attention and ability to perform complex tasks.

Bendrick teaches that there are three aspects to fatigue: circadian rhythm, acute sleep loss and chronic sleep loss. Circadian rhythm means that people have "low points" in their day in terms of alertness and functionality. A mild low point is normally in the mid- to late afternoon, whereas the other, more significant major low point is in the early morning — when one normally is sleeping.

Moreover, circadian rhythm physiology makes it easier for humans to *lengthen* their day rather than to *shorten* it. Indeed, personal experience tells us it is easier to fly from the East Coast to the West Coast of the United States, rather than vice versa. But with the rattler, one is trying to force the body to do just the opposite — shorten the physiological day.

Acute sleep loss refers to how many hours one has been continuously awake. The real problem comes in when the acute sleep loss overlaps the major low point in the circadian rhythm. At that point, performance deteriorates to the point of being identical to someone who is legally drunk. Admittedly, some of this effect can be counteracted with caffeine, cold air and auditory stimulation. However, chronic sleep loss — the difference between the number of hours slept and the number of hours of sleep required — over the preceding two weeks lessens the effects of the usual countermeasures. Hence, the triple whammy of circadian rhythm, plus acute and chronic sleep

**Alcohol Intoxication vs. Sleep Loss**



Source: Accident Investigation Board of Norway/Susan Reed

**Figure 1**

call it Monday, but it could be any day — you start work at 4 p.m. and are off at midnight. Your second day, you work from 2 p.m. to 10 p.m. Your third day, Wednesday, is from 8 a.m. to 4 p.m. Your fourth day, Thursday, is from 6 a.m. to 2 p.m. For your fifth day, you begin at either 10 p.m. or midnight on your fourth day, late Thursday night. You are off at either 6 a.m. or 8 a.m. Friday. Then you have until 4 p.m. on Monday before you have to come back. For someone wanting to maximize time away from work, this is an ideal shift. From the perspective of a responsible individual wanting to ensure air safety, it is irresponsible.

In the days following the Comair accident, the news media made a big deal of the fact that *the controller only had two hours of sleep*. My thought at the time was that the controller was fortunate that he had gotten that much sleep



loss leads to a several-hour “valley of fatigue” during which one’s performance is really poor, whether or not the person realizes it. As the individual climbs out of the valley with the progression of the circadian rhythm, he or she may actually feel pretty good, as if having caught a “second wind.” It is possible to be lulled into a false sense of security.

The effects of fatigue are shown in two graphs that compare performance degradation from hours of wakefulness and performance degradation associated with blood alcohol concentration (Figure 1). The two curves are strikingly similar.<sup>1</sup>

My perspective on workplace fatigue is entirely more personal. It comes from years of working the rattler shift. I can remember lying in bed in the summer at 5 p.m. with all the shutters closed, trying my hardest to get some sleep before I had to get up and go to work at 9 p.m. Several of the neighbors had gathered on the sidewalk outside my bedroom window to talk, and their kids played up and down the sidewalk. It was not an environment conducive to sleep. If I got an hour’s real sleep I felt lucky. And the urgency of knowing that I had to get some sleep, but not being able to sleep, is something I will never forget. Of course, the harder I tried to sleep, the more difficult it became.

There is a flip side to the phenomenon. Amazingly, with an hour or two of quasi-sleep you feel pretty good and alert for the first two or three hours of your shift. Then there is about a three- to four-hour period when the air traffic demands are low, and you get into a “low and slow cruise” mode. You are able to handle about an hour of increased activity from 5 a.m. to 6 a.m. — or at least you think you can — but the last two hours of the shift are very hard. You hope there is enough staffing so that the supervisor can “bury” you on a low-activity position. Even at that, I remember that the effort to stay awake sometimes bordered on pain.

The drive home after the last day of a rattler shift was no better. I would drive with the windows down, blasting the radio and biting my tongue to stay awake. I consider myself lucky

that I got into only one wreck coming home from a rattler shift; the car was a total loss. At the time, I made no connection between the wreck and coming off a rattler shift.

So what is the answer? Air traffic managers must staff the midnight shift. Controllers cannot work a permanent midnight shift because their skills would erode. The U.S. Air Force in Vietnam was faced with a similar challenge of scheduling crews that would fly missions during the hours around midnight. They did so by scheduling three straight midnight shifts separated by days off on either side. This kind of schedule avoids the “double back” feature of the rattler shift. Alternatively, a schedule employing a week of straight mids every two months would be an option. The options may not be popular with the unions because they result in less regular time off between shifts. Either option would, however, be the responsible choice.

The science is clear. As Bendrick demonstrates in his course, one cannot change human physiology. When one tries, the result is truly impaired performance and myriad excuses to justify the current practice, with a search for a target of blame when something bad happens. But for me, it goes beyond science. It is a memory of being so sleep-impaired that at times it verged on pain. This is not a safety mindset, and it is not a characteristic of a safety culture. I must ask again: Isn’t it time to get rid of the rattler? ➔

#### Note

1. Dawson, D.; Reid, K. “Fatigue, Alcohol and Performance Impairment.” *Nature* Volume 388, July–August 1997.

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