A SEA CHANGE in STANDING WATCH

By Captain John Cordle, U.S. Navy, with Dr. Nita Shattuck

A new approach to shipboard routine, as seen through two distinct lenses—science and naval operations—could increase readiness with no additional investment of time or money.

Mission readiness has many components, one of which is the resilience of the human body. As a career surface warfare officer (SWO), I have spent much of my working life in a state of fatigue. Long workdays, traditional three-section watch rotations, and special evolutions often result in 18-hour days and 4 hours or less of sleep for our deployed sailors.

The Naval Safety Center cites fatigue as a contributing factor in nearly 80 percent of mishaps, and yet—unlike the aviation community, where concepts like “crew rest” are embraced—the surface warfare community has remained locked in a “sleep is a luxury” mentality, and the number of hours awake is worn as a badge of honor.

In each command tour, I committed errors on the bridge directly attributable to my own failure to recognize that I was personally fatigued to the point of impaired judgment; two memorable instances caused damage and in one case, personal injury. Both situations came very close to being career enders. But it does not have to be that way.

Here, we examine the issue of resilience, sleep, and operational readiness. To the SWOs reading this, set aside your preconceived notions and read on, because these concepts could change your life.

‘Ready Around the Clock’

In a 2000 Proceedings article titled “Ready Around the Clock,” Captain Lenny Capello told an interesting story of a guided-missile cruiser employing a “Blue and Gold” watch concept in which the crew was split in two. The day was divided into two 12-hour blocks: one block dedicated to working and standing watch, and the other for physical training (PT), sleep, and personal time. Capello’s contention was that, because his crew followed a 24-hour circadian rhythm and had time to work and sleep, the ship was battle-ready around the clock, with a focused, well-rested crew.

Thinking back to my engineering and department-head tours, standing “five and dimes”—five hours on followed by ten off in a rotating sequence, and always tired—I resolved to give it a try if I got the chance. While in command of the guided-missile destroyer USS Oscar Austin (DDG-79), I set out to see if this concept could work on a DDG. With almost 300 sailors, a two-month deployment to the Mediterranean seemed like a perfect opportunity to try out the Blue and Gold concept. With a skeptical but supportive executive officer and some rapid planning, we set up two teams and steamed across the Atlantic.

I would love to report it was a success, but the watchbill proved very unpopular with a large portion of the crew. Those whose duties were limited to watch standing and administrative duties were actually quite pleased with it, but for the specialized technicians, especially those who stood watch, it had many negatives. They had a full workday, and if their gear broke, no one else was there to fix it. As a result, they lost sleep and became fatigued very quickly. We also failed—despite some focused efforts—to follow one of Capello’s tenets of leaving the “off” crew’s time inviolate. The experiment failed—in retrospect because of a lack of “depth on the bench” and failure to embrace a few out-of-the-box ideas. When we deployed a year later, it was in a more standard three- and four-section watchbill. I made a mental note that if some day I was fortunate enough to command a cruiser, I would try again with the larger crew.

Fast-Forward One Decade

Ten years later, while in command of the USS San Jacinto (CG-56), I did get another shot at it. With more than a year to prepare, there was time to set up a watchbill to support maximum battle readiness over an extended deployment. However, several initiatives had reduced the crew size on board to less than the one on my DDG. I had relegated the Blue and Gold idea to the back burner when my navi-
LONG HOURS, NO SLEEP, ENDLESS WATCHES... BUT I LOVE IT. AM I CRAZY?

YOU'RE A SWO.

gator, Lieutenant Ben Matte, came back from a shipboard safety course with a slightly different idea employed by the German navy: 3 hours on, 3 off, 3 on, and 15 off. This was very unorthodox but provided the 24-hour circadian rhythm that was after. So we set up a plan to implement it during our month under way for integrated training.

One key requirement was to qualify four watch sections, since this would be needed for any stable rotation. Another was to craft a workday that accommodated this rather novel plan. Thus armed with a new ship's instruction and a plan, we embarked on our cruise. After just a few weeks, and despite an aggressive strategic-communications program, it appeared we had another failure on our hands. Although the crew liked the 15 hours off work to eat, sleep, and PT, the 3/3/3 rotation resulted in a lot of churn at turnover, and the 3-hour interim was nearly always wasted with barely enough time to eat and perhaps PT. And it was not really enough time for any restful sleep. Then it was back on watch.

In a wardroom/chief petty officer session one chief suggested we try 3 on and 9 off. We made the shift, and suddenly a few good things happened. Everyone was in a stable 24-hour day, standing the same watch every day, and 9 hours off proved to be long enough to eat, sleep, and PT during one break and work during the other. The shorter watches also allowed for better focus and less fatigue. We were on our way.

Not Business as Usual

Deployment came, and thanks to a dedicated effort, we established most of the crew in a four-section rotation with 3 on, 9 off. Some divisions, notably deck, could not support this rotation and were split into two parts, watch standers with a 6/6 rotation and day workers. The
6/6 watch standers still rotated with the 3/9 teams, and swapped duties every week to even out the good and bad deals for all. This was not just a watchbill but a comprehensive plan. Some allowances had to be made (some very difficult to swallow for the “old salts”) for the plan to work. A few examples:

- **Sleeping Hours:** Those watch standers with the 00-03 and 03-06 watches were allowed to sleep in, with berthings dark from 1800 to 0900. Quarters were delayed until 1100 each day.
- **Meal Hours:** An early breakfast was required to support the 0600 watch relief, and a later supper to support the 15-18 watch being able to eat a warm meal.
- **Meetings:** Collateral-duty meetings and other administrative events were restricted to the hours between 0900 and 1500. Ops/Intel and Navigation briefs were moved to the 1530 time slot to allow evening watches to sleep after supper and before watch.
- **Evening Prayer:** Announcements were restricted to operational issues outside of 0900 to 1500, and the chaplain provided an afternoon prayer to avoid waking up the watch standers at Taps. I even seem to recall that Reveille and Taps were no longer passed (gasp!). As stated previously, it is hard to let go of some traditions.

**Tangible Benefits from Day One**

So, did it work? Certainly, acceptance was not unanimous, but for the majority of watch standers, the answer was yes. First and foremost, the ability to preserve a circadian rhythm—working and sleeping the same hours each day—paid huge dividends in reducing fatigue. As the commanding officer, observing watch teams on the bridge and the combat information center (CIC) throughout the day, I noticed that my watch standers were alert and awake, even when I sat in my chair long after Taps. A few other tangible benefits came to light over time and contributed to the positive effects of this rotation.

Three-hour watches allow for better focus and eliminate the low points in a traditional 5-hour watch. This, combined with a stable rotation, resulted in significantly less fatigue. Since the teams rotate together, command and control is stable from the bridge to CIC to engineering. The ability to build stable teams and combine key personnel based on skill level and experience and have them remain the same was a tremendous tool for training junior personnel.

One of the junior sailors in engineering gave me an epiphany when he expressed satisfaction that he was no longer experiencing heat stress. The short watch in the hot spaces (the Persian Gulf in summer, for example) and triple the time outside the hot area virtually eliminated the need for “stay time” limitations and mitigated the effects of heat and humidity on engineering watch standers. After reviewing the program, the commanding officer of the Surface Warfare Officer School wrote that he had just heard a presentation on heat stress in which the instructor told the class that a watch stander had to get at least six hours of sleep at night and twice as long out of the hot space as he had spent in it to recover fully. In the email, he wrote, “I stood up [in the class] and said that this was physically impossible on a Navy warship... today you have proved me wrong.” In fact, it is now passed on to
This graph shows the effectiveness of watch standers on a 4-section rotation using the more traditional 4/12 schedule. Watch standers on this watch have a mean 82.7 percent predicted effectiveness while on watch. 33.3 percent of the time, an individual's predicted effectiveness falls below 80 percent.

Where to Go from Here

Based on feedback from some of the crew, the safety officer submitted a message input for the annual shipboard safety award. That led to the ship's selection to receive the Secretary of the Navy award for the class. The Naval Safety Center then took the watchbill one step further and conducted an initial fatigue analysis. In a message to the Fleet, it recommended to all ships that this watchbill be considered since "initial indications are that fatigue levels are much lower than all other watch rotations."

A follow-on came when the Naval Postgraduate School studied this watchbill under the supervision of this article's co-author, Dr. Nita Shattuck. An additional area of interest came through the Combat and Operations Stress Control (COSC) program, headed by retired Commander Leanne Braddock. Studies have shown that fatigue is a significant contributor to stress, and the COSC programs are looking for any areas that could reduce stress on the crew.

What is the bottom line? First, this approach is not just a watchbill. It is a sea change in shipboard daily routine. Some ships have adopted it in various forms. One destroyer and one cruiser report using a five-section watch-
bill, rotated once a week, that also maintains a circadian rhythm.

This concept does not come without cost. It requires "breaking some china" (rethinking when you conduct quarters, evening prayer, messing and berthing, meetings, etc.). And not everyone will like it. Not all divisions on all ships will be able to achieve a four-section watch rotation. It requires time and dedicated planning. More frequent because of "drowsy driving" and making it equivalent to drunk driving. Drowsy-driving bills are being considered by several other states in an attempt to address this all-too-common cause of deadly accidents.

While scientific research continues to reveal our crucial requirement for sleep to live healthy lives, opposing forces push us to sleep less. Pressure to stay connected through social media and omnipresent technology runs counter to our need for getting adequate amounts of sleep. Add to that the pressures of top-down requirements to be "more efficient" and "do more with less" and you create the environment in which the military currently operates. Despite the strides made in our understanding of the effects of sleep on performance, the U.S. military has continued to ignore problems related to sleep and fatigue.

For the past 12 years, Naval Postgraduate School’s Operations Research Department has studied sleep and fatigue in operational environments. Together with our active-duty graduate students, we have collected data on the sleep and work patterns of military service members in a wide variety of contexts—including a detailed look at crew members on board various surface ships and submarines. The results present a compelling and concerning picture. U.S. Navy sailors are chronically sleep-deprived, often working in dangerously fatigued states to accomplish missions that demand the highest levels of vigilance and are critical to our nation’s defense.

We use the officially sanctioned Department of Defense model for fatigue avoidance, the Sleep, Activity, Fatigue, and Task Effectiveness (SAFTE) model and the Fatigue Avoidance Scheduling Tool (FAST) to predict fatigue and alertness levels based on sleep patterns. By analyzing various watch rotations from Navy ships using the FAST program, individual watch-stander performance can be predicted. Wrist-worn activity monitors, or "sleep watches," are used to record actual sleep and work patterns of warfighters.

These methods have been combined with the results from a survey of Captain Cordle’s San Jacinto crew following their implementation of a 3/9 watchstanding schedule. The result was an alternative 3/9 watchstanding schedule that helps maintain alertness and reduce fatigue in Navy crews. We continue to evaluate these circadian-based (24-
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