

## Shiftwork Practices in the United States Navy: A Study of Sleep and Performance in Watchstanders aboard the USS JASON DUNHAM

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### Introduction

It is well established that members of the military get inadequate sleep. Shay (1998) traced sleep deprivation in the military back to the ancient Greeks. In one of the first studies of sleep in the U.S. military, Kleitman (1963) reported on the sleep patterns of Navy submariners in the 1950s. Unfortunately, all branches of the military seem steeped in this long tradition of sacrificing sleep and the problem has only been exacerbated by the 24/7 nature of continuous operations in the current defense climate. Despite efforts to address sleep deprivation in the military, it still poses a serious threat to safety and operational effectiveness.

Sailors in the United States Navy are habitual shiftworkers, often working shifts that result in circadian misalignment equating to an 18 or 20-hour day without weekends or time for recovery. Working other than a 24-hour day, especially shorter days that impose a type of chronic jet-lag, is a well-known contributor to fatigue in the civilian shiftwork population. We proposed the adoption of a 3-on/9-off circadian-aligned watchstanding schedule based on a 4-section watchbill where sailors stand 3-hour watches that commence every 12 hours. We then documented the work and rest patterns of the crewmembers working this alternative schedules as well as other traditional schedules aboard the USS JASON Dunham (DDG 109), an Arleigh Burke class destroyer (9300 tons).

### Methods

As part of a larger data collection on 122 crewmembers, 33 U.S. Navy sailors participated in a two-week study exploring the impact of two watchstanding schedules on sleep/wake patterns and performance in an operational environment. The alternative watchstanding schedule (the “3/9”) involved standing 3 hours of watch followed by 9 hours off watch. The standard schedule (the “6/6”) consisted of standing 6 hours of watch followed by 6 hours off watch. Each sailor wore an actigraph, completed a daily sleep and activity log, and performed a 3-minute psychomotor vigilance test before and after standing watch.

### Results

This preliminary analysis focused on sailors’ sleep patterns. A mixed-effects ANOVA was used to examine the effects of watchstanding schedule and day on total sleep time per 24-hour period. Sailors working the alternative watchstanding schedule received an average of 86 minutes more sleep compared to their counterparts working the standard 6/6 schedule ( $F_{1,302}=22.06$ ;  $p<0.001$ ). The interaction between watchstanding schedule and day of the study was also statistically significant ( $F_{11,302}=2.17$ ;  $p=0.02$ ).

## Conclusion

Preliminary results indicate sailors working an alternative watchstanding schedule get more sleep than those on a standard schedule. Additional sleep gained using this alternative schedule may have direct impact on sailors' performance within the surface navy community.

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