



Crew Endurance Management Newsletter

an information resource about the Crew Endurance Management System (CEMS) for its practitioners and those interested in learning more about it

Crew Endurance Resources

Welcome to the Crew Endurance Management Newsletter, where we continue to bring you the latest in sleep and endurance-related information to support your personal knowledge of Crew Endurance Management and implementation.

READER INTERFACE NOTE:

When reading on the Internet, the symbol to the right indicates a hyperlink for the subject matter indicated in blue, underlined text. Readers with printed copies can visit our website for more information:



<http://www.uscg.mil/hq/g-m/cems/index.htm>



Much of the information in this issue was originally printed in the National Sleep Foundation's weekly *Alert* – if you'd like to receive this information regularly, sign up with them [here](#) – it's free!

Please be sure to pass this information along to others so that they can [register](#) with us.

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Key to Implementing CEMS: Vertical Alignment

by LCDR Vivianne Louie

Well, it took 9 issues, but we've highlighted all 15 crew endurance risk factors, the complications involved, and tips to improve conditions for each. So now we're shifting our spotlight to some key components that will help you implement and sustain CEMS indefinitely.

Our first focus features what we call "vertical alignment," which helps knit all the parts of CEMS together by getting many different types of company members involved in promoting and sustaining CEMS practices. Supporting vertical alignment helps to ensure that all members really understand CEMS, its relevance to their lives, and why they should carry out its recommendations.

It's difficult to break vertical alignment into "steps," – it's more like creating a "buzz." Companies must generate and sustain this positive "CEMS buzz" for all who will use it, from the highest-level managers to the newest deckhands.

Companywide Training

No company can successfully implement CEMS unless all of its members understand the program, its risk factors, and the factors' causes and solutions. To support vertical alignment, company members at all levels should understand CEMS so that they can better identify and mitigate endurance risk factors on their vessel or fleet.

Companies can build vertical alignment by providing education to as many of its employees as possible. Just knowing what to look for helps build a vessel's safety culture, creating heightened awareness to promote practices that are working while improving those that aren't.

Training is often best done by sending an employee to become a trained CEMS Coach and/or Expert. This Coach/Expert can then disseminate information, formally or informally, via presentations, computer-based training, handouts, posters, or everyday interactions.

Companywide Membership

The members of a Crew Endurance Working Group (CEWG) have the power to make or break a successful CEMS program. Establishing vertical alignment here is key because the CEWG is responsible for many critical aspects of implementing a CEMS program.

When forming a CEWG, you'd certainly want to involve anyone with interest in CEMS – where there's a will, they'll find a way to make it happen!

Beyond those who will champion the program, though, a CEWG should also include or represent varied individuals who stand to be affected by CEMS implementation, so that all of these individuals can communicate with each

Supporting vertical alignment helps to ensure that members understand CEMS and can carry out its recommendations.

other up and down the company hierarchy.

That might mean that a vessel's cook would voluntarily look into healthier food choices based on training received, or company officers would hear crew praise for alternate policies they approve. By planning and reevaluating together, all members of a CEWG look out for each other's interests as well as their own.

Companywide Buy-In

All levels of a company need to be convinced that CEMS is a good idea, or "buy into" the program, if it's going to be successful. When members see that the program is feasible and will benefit the company, it's easier to encourage everyone to put it into action.

If members *don't* buy into the program, it can be easy to stall or undermine progress. This may be especially true for those in charge of the bottom line, who may say, "We just don't have any extra money right now, forget it!"

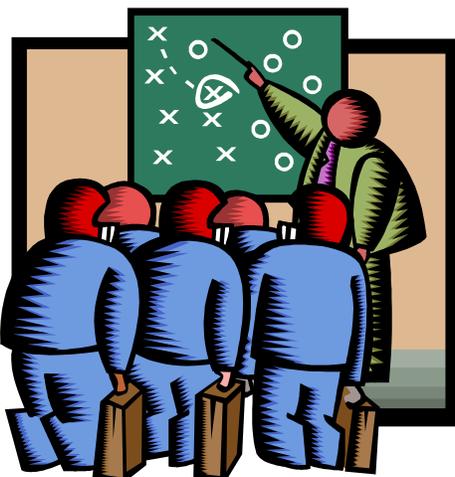
Company officers who *do* buy into CEMS, on the other hand, would know enough about each risk factor to best choose how to "pick their battles." Depending on the resources available, they could use their training and drive to improve working conditions at low or reasonable expense. Even better, some company officers may have so much faith in the program that they're willing to make an investment (small or large), trusting that it will come back to the company in the form of less accidents, better employee retention, less employee sick days, and/or lower health care payouts.

Obtaining buy-in from everyone in the organization is essential, but it won't happen overnight. Setting the foundation for implementing a CEMS program can take many

months, and then several more years to fully establish cultural and organizational changes. Like the CEMS process, obtaining buy-in requires cycles of continuous improvement.

Companywide Communication

Finally, vertical alignment takes place when members communicate effectively with each other, regardless of status. It's important for crewmembers to have a way to share their experiences with daily risks up through the ranks. Likewise, those at the upper levels of management should understand how important those risks are, and weigh how



equally important it may be to fund or otherwise support CEMS prevention efforts.

A good way to assess a company's vertical alignment in this area is to examine its policies. A company may signal its support of CEMS by responding favorably to requests for changes in napping or courtesy policies.

For example, perhaps crewmembers coming off the night watch have to then go eat amongst those just rising for the day. The bright lights may delay their ability to fall asleep. To show support, a vessel's cook could keep light meal choices handy in the kitchen for the night watch, which they could snack on a few hours before the end of their shift.

This would have two effects that could help the night watch fall asleep faster: they can head right to their bunks after work before the sun comes up instead of going to eat, and they wouldn't have to try to digest a large meal while trying to fall asleep. This solution addresses the concern with some effort on the cook's part, a company policy allowing for this meal break, and little else.

Vertical alignment has a strong impact on a program's success. One CEMS demonstration project company (check out the latest on the project at our website here [\[link\]](#)) showed its support for the program by keeping 100% of its fleet trained in CEMS. If upper levels of management believe in CEMS' importance (as shown here by providing training), they often have the most power to make things happen.

What's In It for Me?

CEMS can immediately result in increased awareness and understanding of endurance and fatigue issues, even if a company has just begun.

When properly implemented, CEMS provides a three-way win: operating companies get safer, more productive employees, the employees get safer, healthier workplaces and a better quality of life, and the Coast Guard and general public get an overall reduction in risk of fatigue-related accidents.

Changing an organizational culture is not easy. It's often difficult to change hundreds of years of tradition by trying to adopt new methods, but when everyone sees that it's in their best interest, they're more willing to try them.

As you think about creating your vertical alignment, just remember that it is adaptable – something any company can do if they are truly willing!

CEMS and Your Health

“Where am I?” — Sleep Helps the Brain Find its Way

(Originally from the Jan. 18, 2006 NSF Alert)

Can't remember how to get to where you're going? A good night's sleep might do you good. Researchers at the University of California and Stanford University recently conducted a study in which sleep deprivation had a negative effect on spatial memory.

Spatial memory includes the ability to remember how to reach a particular destination. Learning tasks using spatial memory feed the area of the brain that controls it, spurring the production of new brain cells.

The study involved an experiment where rats tried to find their way through a



maze to test their sense of direction either with or without sleep. The sleep-deprived rats had a difficult time remembering their way through the maze because they had a harder time with their sense of direction, which is influenced by spatial memory. Meanwhile, the rats that received adequate sleep navigated the maze better and generated new brain cells.

More Resources:

- Read the [abstract](#)
- Check out this [article about the study](#)

Sleep Deprivation's “Explosive” Dangers

(Originally from the Feb. 8, 2006 NSF Alert)

When crewmembers lose concentration on the job, they open themselves up to unlimited potential dangers. That's why we pack these issues with information on getting the best rest possible and other tips to boost your endurance.

What better way to remind ourselves of this than to look at such risks in another dangerous arena—none other than Three Mile Island (TMI), the site of the infamous 1979 nuclear accident. The disaster at this nuclear power plant involved a partial meltdown of the reactor core, as well as some radiation leakage. Fortunately, the containment building did not rupture.

While it should be a distant memory by now, the *Patriot-News* re-

cently reported that the beefed-up, post-9/11 security at TMI is literally “sleeping on the job.” Guards responsible for training at TMI have been advising new hires about the best places to take naps without getting caught. According to John Young, the head of security, “It will stop immediately.”

Since security efforts have increased since 9/11, long hours and consecutive shifts have put many guards at risk for inattentiveness, sleepiness, and inability to perform to the best of their ability. AmerGen Energy, the company that operates TMI, has documented five incidents of “inattentiveness” among personnel since 2004, and industry and federal regulators often use the term “inattentiveness” to mean “sleeping.”

It shouldn't be surprising that security personnel at TMI are struggling with fatigue. The Nuclear Regulatory Commission regulations currently permit a maximum of 12-hour shifts six days a week. This kind of schedule can seriously impair workers' energy and alertness, increasing the risk of human error and disaster at the power plant.

More Resources:

- Read the [article](#)
- Read information on the [NRC's proposed rule](#)
- Read [NSF's comments on the rule](#)
- See the [NRC report on the TMI meltdown](#)

CEMS and Your Health

How Does Melatonin Affect Sleep?

(Originally from the Feb. 21, 2006 NSF Alert)

Regular readers of the CEMS Newsletter are no strangers to the word “melatonin,” but it never hurts to offer a refresher course!

CEMS promotes the use of light management to help regulate melatonin production. In the absence of light, the body naturally produces melatonin as a signal for the body to sleep:

Dark = melatonin produced = sleepy
Light = melatonin suppressed = alert

But can melatonin serve as a medical treatment for sleep disorders? Recent studies suggest that the effects, if any, are usually clinically insignificant.

As reported on February 21 in the British Medical Journal (BMJ), a team of researchers at the University of Alberta conducted a systematic review of the efficacy and safety of melatonin supplements. The study was random and placebo-controlled, incorporating 524 people with secondary sleep disorders (sleep problems that are associated with medical, neurological, or substance misuse disorders) or sleep disorders associated with sleep restriction, such as jet lag or shift work disorder.

The study indicated that melatonin supplements had no significant effect on the participants' ability to fall asleep and little effect on their ability to remain asleep. It also found that melatonin is safe for short-term use (3 months or less).

The U.S. Agency for Healthcare Research and Quality and the National Center for Complementary and Alternative Medicine at the



National Institutes of Health (NIH) supported the BMJ findings. NIH recently conducted a review of literature on melatonin, finding that supplements helped people with delayed-phase sleep syndrome fall asleep somewhat faster, but not much. Melatonin was minimally helpful in promoting sleep for people with insomnia.

While both the BMJ study and the NIH study indicate that melatonin can have a regulating effect on the timing of sleep, depending on when the drug is taken, the instances and conditions are not significant enough to draw conclusions or make favorable recommendations. For example, in the BMJ study, even though sleep efficiency for people with secondary sleep disorders was statistically significant with melatonin, the effect was small – 1.9%. That's an increase of less than 10 minutes in the amount of time spent asleep for eight hours spent in bed.

Perhaps further research can better refine recommendations for the effective use of melatonin. In the meantime, we'll continue to advocate light management. At its most basic, this means using bright light inputs to keep the body awake and alert during watch, and avoiding the same inputs to help fall asleep afterwards.

More Resources:

- Read the [BMJ review](#) 
- Check out the [NIH review](#) 

Taking a Ten-Minute Nap May Be the Key to Getting Refreshed

(Originally from the June 6, 2006 NSF Alert)

Want to take a short nap to catch up on sleep? How do you know how much time you need to refresh yourself? How about 10 minutes?

According to researchers at the School of Psychology at Flinders University in Adelaide, SA, Australia, “10” may be the magic number of minutes when it comes to reenergizing the body by napping.

The researchers used a sample of 24 healthy young adults who were good sleepers and did not nap regularly. The question asked: “What would be most effective after receiving five hours of sleep at night—no nap, or a 5-minute, 10-minute, 20-minute, or 30-minute nap?” The participants took their naps at 3:00 p.m. Researchers measured their performance for three hours afterwards.

The study found that the 10-minute nap produced the most performance benefits while simultaneously producing the least side effects. The 10-minute nap improved cognitive function, subjective sleepiness, sleep latency, fatigue, and vigor, among other benefits, and some nap benefits lasted up to 155 minutes!

In contrast, the 20-minute nap's improvements emerged 35 minutes after napping and lasted up to 125 minutes. The 30-minute nap produced a period of impaired alertness and performance (or “sleep inertia”) immediately after napping, followed by improvements lasting up to 155 minutes.

The researchers would like to learn more about what happens in those first ten minutes of sleep to benefit the body.

More Resources:

- Read the [abstract](#) 
- Get [healthy sleep tips](#) 
- Learn [how sleep works](#) 



CEMS and Your Health

Healthy Sleep Prevents Injuries

(Originally from the March 7, 2006 NSF Alert)

A study at the University of Iowa found that a person's risk of injury decreases when one gets adequate sleep. For almost five years (August 1999 – June 2004), the researchers contacted 1345 adults from a rural community every six months to ask about any injuries suffered in that time frame.

The researchers found that, when compared to people sleeping 7.5-8.5 hours nightly, others sleeping less

than 7.5 hours nightly increased their risk of injury by 61%. Among the study



participants, the average number of hours slept per night was 7.2 hours.

These findings indicate that adequate sleep is important for preventing injuries in rural populations, and may apply to other groups as well.

More Resources:

- Read the [abstract](#) 
- See NSF's *Sleep for Kids* site about [the connection between sleep and childhood injuries](#) 
- More about the link between sleep deprivation and injury among children [here](#) 

Setting the Body's Clock to a Healthier Rhythm

(Originally from the March 7, 2006 NSF Alert)

Lithium may stabilize the body's sleep-wake cycle and fix daily rhythms, according to a study funded by the National Institute of Mental Health (NIMH). The study concentrated on how lithium encourages healthier biological rhythms associated with the body's "master clock," which controls sleep, body temperature, and metabolism.

The results of the study, published in *Science* on February 17, 2006, show that the body's "master clock" works properly only when the clock genes turn "on" and "off" in a synchronized manner. Researchers believe that this gene process can be disrupted in individuals with bipolar disorder. In the study, the introduction of lithium turned "off" one gene while turning "on" another, stimulating healthier body rhythms.

More Resources:

- Read the [abstract](#) 
- Take a look at the [NIMH press release](#) 
- Learn about [healthy sleep](#) 



Crew Alertness in Other Transportation Modes

Fatigue Played Role in Plane Crash

(Originally from the Jan. 31, 2006 NSF Alert)

On October 19, 2004, Corporate Airlines Flight 5966 crashed short of the runway and collided into two trees, killing two crewmembers and 11 of 13 passengers. An onboard recorder revealed that the pilot and co-pilot ignored guidance regarding the speed of their descent and where to land, joking and cursing as warning signals alerted them to the danger ahead.

A recent investigation showed that fatigue and poor judgment contributed to the crash. The National Transportation Safety Board (NTSB) found that the pilots were making their sixth flight of the day and had been on duty for more than 14 hours.

This incident led NTSB to recommend changes to work rules by the Federal Aviation Administration (FAA) for the second time in the past 12 years. Currently, the FAA allows pilots up to 16 hours on duty with 8 hours of rest in a 24-hour period. NTSB's report requests that the FAA "Modify and simplify the flight crew hours-of-service regulations to take into consideration factors such as length of duty day, starting time, workload,

and other factors shown by recent research, scientific evidence, and current industry experience to affect crew alertness."

But as airlines have run into financial troubles, more flights may be getting squeezed into a pilot's day in order to cut costs per flight. In the case of the 2004 crash, the crew of Corporate Airlines Flight 5966 had been given eight hours of rest time, but that didn't necessarily mean that the crew could get eight hours of sleep — they also had to get a hotel, eat, wake and freshen up from their rest period, and then return to the airport in that eight-hour window.

More Resources:

- Read the [NTSB report](#) 
- Read the [Washington Post article](#) 

NTSB Finds Reduced Alertness, Lack of Rollback Protection Feature Contributed to DC Subway Collision

(Originally from a March 23, 2006 NTSB Press Release)

Based on our usual content, you may already know that the CEMS newsletter highlights stories of human endurance and how to improve it. For example, in this story, inadequate sleep contributed to an incident. We would also like you to note here the NTSB / WMATA communication regarding the lack of rollback protection features and efforts to keep workers well-informed. Just like with CEMS, it is important to share "lessons learned," as well as their implications for what to do in the future, should a similar situation occur.

The National Transportation Safety Board (NTSB) recently determined that a collision between two trains of the Washington Metropolitan Area Transit Authority (WMATA) was caused by one operator's failure to respond to the train's 78-second rollback and prevent the accident by applying the brakes. During the Board's investigation, it was noted that the train operator's inadequate sleep may have contributed to his failure to respond.

On November 3, 2004, train 105 was in the process of loading and discharging passengers when it was struck by train 703, which had been rolling backwards for more than 2200 feet at about 35 mph. There were no fatalities, but about 20 passengers went to the hospital, and property damage was estimated at \$3 million.

The lack of a rollback protection feature to stop the train (when operated in the manual mode) contributed to the accident.

Within a week, WMATA issued a memo as well as a supplement to all train operators and Metrorail supervisors concerning the absence of this protection feature and calling for the entire fleet of affected cars to be covered.

Two weeks after WMATA's memos, the NTSB issued them a safety recommendation to immediately revise the memos to include new, specific, written instructions on identifying and responding to emergency rollback situations, and to provide training to operators on the procedures to follow in the event of a train rollback.

The board also recommended that WMATA equip all existing and future trains with rollback protection features as soon as possible, and that the Federal Transit Authority ensure that the time off between daily tours of duty allows train operators to get at least eight hours of uninterrupted sleep.

More Resources:

- Read the NTSB press release [here](#) 
- Check out information on NTSB board meetings [here](#)



CEMS Training Update and Upcoming Sessions

Coaches Training

Crew Endurance Coaches Training continues to expand via our certified Crew Endurance Expert network. There are currently **over 700** trained coaches in the commercial maritime industry.

Please check our [website](#)  for the most current training information and updates.

Experts Training

ARTCO will hold the next Experts Training

Dates: August 8-10, 2006

Location: St. Louis, MO

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Crew Endurance Resources Online

The [Coast Guard CEMS Website](#)  continues to be updated with additional CEMS information and resources. Thoughts and suggestions are always welcome regarding content and information.

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