



# CREW ENDURANCE MANAGEMENT

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## Getting Back To Crew Endurance Management System (CEMS) Basics

*CDR Benjamin Hawkins*

From time to time, we need to review our goals so that we can make timely heading corrections. I believe this is particularly important when it comes to the practice of CEMS.

Whether CEMS is part of your company's operational initiative or your personal effort to maintain safety and wellbeing, interventions must be re-evaluated from time to time, to confirm they truly help combat fatigue. Examining your current CEMS interventions and reviewing basic concepts will enable you to adapt CEMS plans to new endurance challenges arising from new or modified operational requirements, changes in shipboard technology, or new processes introduced into the work environment.

In this issue, we will shift our attention to critical principles, to ensure that practitioners are getting the most out of implementing CEMS. Though CEMS courses and tools emphasize important principles, it is common for focus to waver from core objectives, particularly after a plan has been in place for several months. Emphasizing the basics can help us refocus and achieve our goals.

## The Crew Endurance Working Group

In order to implement the Crew Endurance Management System (CEMS), an organization should build and maintain a Crew Endurance Working Group (CEWG). This group is responsible for assessing, and finding ways to mitigate, crew endurance risk factors that impact crewmember safety and health. Members of the CEWG serve as agents of change, and carry out the practices of the Crew Endurance Management System—namely to assess risks, identify controls, implement crew endurance plans to mitigate identified risks, and assess the effectiveness of existing crew endurance plans. All certified CEMS coaches and experts are taught that a CEWG is critical for implementing CEMS in any organization



## CEWG: Critical to Implementing CEMS

CEWG members are brought in from different departments and communities within a company. Typically, members include fleet managers, operations managers, safety managers, crewmembers, dispatchers, schedulers, and training coordinators. The group should consist of personnel who will be affected by the implementation of CEMS practices. Because any decisions made by the group stand to have wide impact throughout an organization, management support for the group is critical. By maintaining the CEWG, promoting its activities, and supporting its decisions, company management demonstrates its commitment to addressing crew endurance



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risks in operations, and to protecting the safety, health, and well-being of its crewmembers.

The role of the CEWG is vital to identifying and mitigating crew endurance risk factors in the work environment. Ideally, CEWG representatives should be well educated in Crew Endurance Management concepts and processes. Maintaining this group allows a company to harness basic CEMS knowledge, so that members may assess whether CEMS risk factors are lurking within the intricacies of shipboard operations. Because CEMS interventions may take time to implement, or require repeated efforts to achieve effective results, an active CEWG is needed to provide continuity to CEMS plans and practices. A well-educated CEWG keeps shipboard CEMS risk controls effective, and maintains crewmembers' confidence in the value of the CEMS program.

A fundamental value of working groups is that they bridge key issues whenever companies implement operational changes. Working groups:

1. Represent those who stand to be impacted by the changes;
2. Communicate relevant information to everyone involved;
3. Demonstrate management commitment to making the changes;
4. Promote confidence in the resulting effects of the changes; and
5. Champion the vision.

So, when was the last time your company's CEWG met? 

## Core vs. Modulating Crew Endurance Risk Factors

If you are familiar with the Crew Endurance Management System (CEMS), you are probably aware that there are fifteen identified crew endurance risk factors. What may be less familiar to you is that crew endurance risk factors fall into two distinct groups: **Core** and **Modulating** risk factors.

### CORE Risk Factors

**Core** endurance risk factors directly impact how much sleep you get and, therefore, how much energy your body makes to replenish what it needs to do work each day. When your body and brain lack the energy to function, you feel physically tired and experience muddled thinking. This sets you up to make mistakes while you perform your duties. Whether your work involves navigation, building tow, driving a truck, monitoring air traffic, or even simply walking on the deck of a ship, fatigue affects clear thinking, and leads to loss of situational awareness. In recent years, a strong causal relationship has been demonstrated between fatigue, loss of situational awareness, human error, and accidents in the transportation industry. Core endurance risk factors play a significant role in the linkage between fatigue and loss of situational awareness.

**Core** risk factors include:

- Insufficient daily sleep duration;
- Poor sleep quality;



- Sleep Fragmentation;
- Scheduling main sleep period during the day;
- Changing work/rest schedules;
- Long work hours; and
- No opportunities to make up lost sleep.

Whether you are on a Crew Endurance Working Group (CEWG), or practicing CEMS to benefit your own situation, you must keep in mind that these **Core** risk factors strongly contribute to a loss of situational awareness and increased human error. If you recognize one or more of these **Core** risk factors in your situation, whether in or out of the workplace, you must remove or reduce their impact using interventions such as light management practices, schedule modifications, etc.



## MODULATING Risk Factors

You may be wondering about the other endurance risk factors. These are the **Modulating** risk factors, which include:

- Poor diet;
- High workload;
- High work stress;
- No opportunity for exercise;
- Lack of control over work environment or decisions;
- Excessive exposure to extreme environments;
- Family stress; and
- Isolation from family.

When present, **Modulating** risk factors worsen the effects of the **Core** risk factors. For instance, if you are a CEMS coach or expert, you learn that it is important to manage your diet to protect your endurance. You learn that eating large meals and spicy foods interfere with sleep quality. One CEMS recommendation is to avoid eating a large meal right before going to bed, particularly if you are coming off of the night watch. Consider what would happen if you are already suffering from the effects of one or more of the **Core** risk factors, would you want to reduce your sleep further by eating that meal?

Say you are a crewmember experiencing sleep disruption (or reduction in sleep duration) on a thirty-day



voyage. Now consider the effect on sleep if you are also impacted by family stress in addition to the **Core** risk factors. This combination of factors sets you up for increased fatigue, distraction at work, and loss of situational awareness.

Each of the fifteen crew endurance factors listed above is important when considering shipboard safety. In CEMS, the **Core** risk factors **must** be addressed to ensure that crewmembers have the energy reserves to perform their work safely and effectively. The **Modulating** risk factors should also be managed because they can further sap your energy and worsen the effects of the core risk factors. Therefore, managing **Modulating** risk factors without controlling the **Core** risk factors is insufficient to protect crewmembers' overall endurance levels. Understanding this concept will help you focus CEMS implementation efforts on mitigating the impact of **Core** risk factors on crewmember safety and health. 

## Managing Crew Travel Time

*LCDR Vivianne Louie*

**A**s paid employees, we are expected to show up for work on time, refreshed and ready to carry out a full day's duty. For some, this task may be predictable and easy. For others, such as those who work in the maritime industry, traveling to the office—namely the ship—can be stressful; it is often a job in and of itself. Simply meeting the vessel requires coordination between the individual, the office, and the vessel. It can take days, and may require several modes of transportation and travel through numerous time zones, often to remote areas. What's more, mariners must often begin work as soon as they arrive at the vessel, without having had the opportunity to adjust to climate changes, work hours, and the shipboard environment. All these factors should be taken seriously because they can not only affect a mariner's performance and safety, but can also impact the lives of other crewmembers, and even the public.



## Quality Action Team (QAT)

In light of recent issues and questions dealing with work hours and travel time laws and policy, the Coast Guard and American Waterways Operators (AWO) Safety Partnership agreed to establish a Quality Action Team (QAT) for the Safe Management of Crew Travel Time. The QAT:

- Promotes safe practices for managing crew travel time throughout the tugboat, towboat and barge industry; and
- Ensures clear and consistent industry understanding of current Coast Guard regulations and policies governing crewmember travel time.

On October 24, 2008, the QAT published a report that was made available to the public. This report clarified current laws and Coast Guard regulations and policies regarding crew travel time, current industry practices from various towing operations, and best practices for managing crew travel time.

## QAT Recommendations

The QAT made two overarching recommendations about safe management of crew travel time:

1. Management must maintain an active, ongoing role in supervising crew travel time and complying with relevant laws, regulations, and Coast Guard policies concerning travel time, work, and rest; and

2. Effectively managing crew travel time requires attention to three areas: training for vessel and shoreside personnel; crew scheduling and dispatch; and transportation and logistics.

Crew travel time recommendations that relate specifically to crew endurance management include:

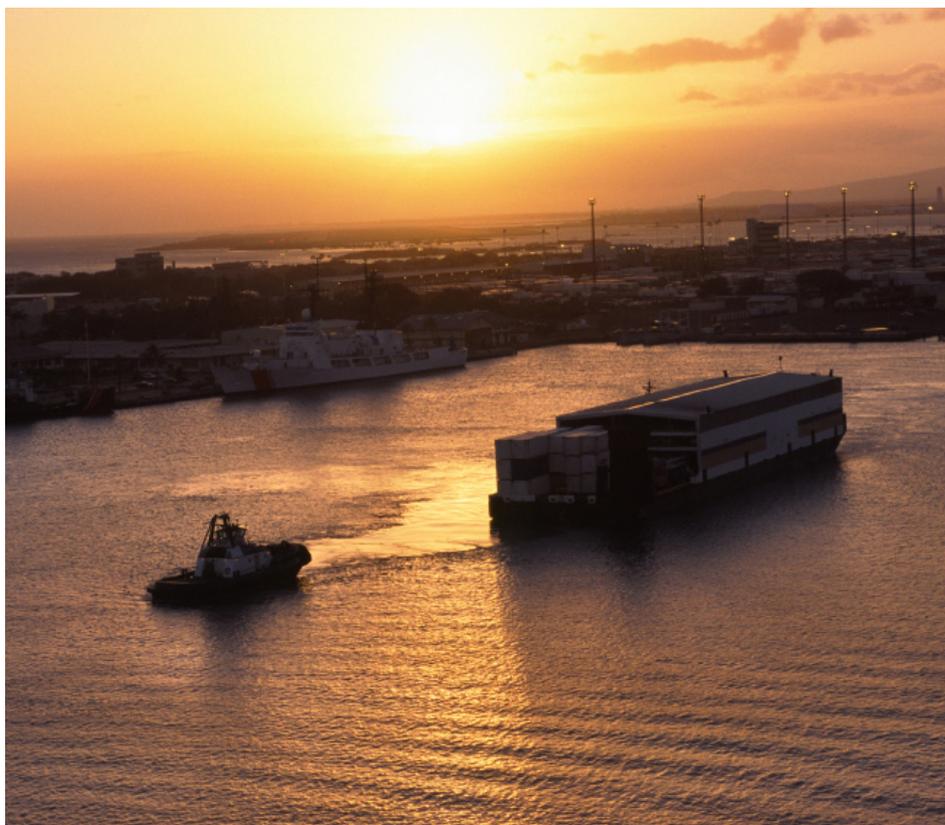
- Training and educating crewmembers and shoreside personnel about CEMS principles; relevant laws, regulations, and policies; and company policies and individual responsibilities regarding work, rest, and travel time;
- Adopting practices that minimize travel time and distance to the vessel;
- If travel time to the vessel exceeds six hours, ensuring that it is followed by a rest period before a crewmember assumes the watch;
- Providing appropriate locations for crewmembers to rest after extended travel (options include a bunkhouse, hotel, or the vessel itself, as long as crewmembers have an opportunity to lie down in a dark, quiet environment and get needed rest);
- Timing crew changes to allow for circadian rhythms, and avoiding travel in the middle of the night or very early in the morning;
- Establishing and actively communicating policy to crewmembers that if they feel fatigued, they should not take the watch until they get adequate rest;
- Providing a predictable return-to-work schedule and maximum advance notice of schedule changes;
- Minimizing crewmember fatigue by choosing transportation modes to a vessel that take into account such factors as travel distance and arrival time;
- If using a crew van, providing a designated driver(s)—e.g., a professional driver, or a crewmember who will not be assuming the watch upon arrival at the vessel;





- Providing accommodations where crewmembers can rest after disembarking from the vessel, before beginning their travel home; and
- If a crewmember is asked to drive a company vehicle back from the vessel to a designated location at the end of a voyage, choose someone who has been off watch before the vessel's arrival.

For a full list of the recommendations, or to see the complete report, follow this link to the AWO website: [http://www.americanwaterways.com/commitment\\_safety/QAT/Index.html](http://www.americanwaterways.com/commitment_safety/QAT/Index.html) 



## Managing Misinformation Watch Schedules and Sleepiness Among Bridge Officers



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**T**he Finnish Institute of Occupational Health recently conducted a study in which they collected data from a total of 185 Finnish Officers on Watch (OOW). Their analysis showed the following:

- Watchstanding officers, who stood the 6 on / 6 off watch, regularly obtained less sleep and recovery than watchstanders who stood the 4 on / 8 off;
- Watchstanders on the 6 on / 6 off experienced greater amounts of sleepiness; and
- Watchstanders on the 6 on / 6 off had the greatest problem with sleepiness during the period from 0400 to 0600, as opposed to other watches assessed.

These findings confirm the need for 7 to 8 continuous hours of sleep and, thus, the need to find alternatives to the 6 on / 6 off watch schedule. This study also supports the need to adapt crewmember physiology to work schedules to manage circadian effects on alertness and sleep efficiency. To learn more about this study, visit the following site:

<http://www.ncbi.nlm.nih.gov/pubmed/18484371> 



## Crowley: The Host with the Most

**O**n April 7–9<sup>th</sup>, Crowley hosted a Crew Endurance Management System (CEMS) Experts Training Course at their Jacksonville, FL office location. Attendees included certified CEMS coaches from Moran Towing, American Commercial Line, Crowley, and Deloach Marine. The Experts Training Course focused on developing the skills necessary for implementing CEMS in operations and for educating future coaches. The instructors for this training course were Ms. Pik Kwan Rivera (USCG), Dr. Tony Carvalhais (USCG), Dr. Carlos Comperatore (USCG), and Mr. Mike Bowman (Kirby Corporation).

### A Brief Description of CEMS Experts Training

CEMS Experts Training is the current available venue for companies to develop resident CEMS Expertise. CEMS Experts are educated in technical knowledge to better understand CEMS principles and implement CEMS processes and practices. Course elements include lectures, tool driven exercises,

and hands-on experience, using CEMS tools to conduct Crew Endurance Risk Factors Assessments, perform schedule evaluations for endurance risks, and identify interventions to control endurance risks. Experts use these tools to help companies implement CEMS.

When they have demonstrated adequate knowledge of CEMS, course attendees are designated by the US Coast Guard as CEMS Experts, and are granted the privilege to conduct coaches training. Attendees must have completed CEMS coaches training requirements before attending CEMS Experts Training.

US Coast Guard Headquarters staff from the Human Element and Ship Design Division manage CEMS Experts Training. Industry representatives are encouraged to contact Ms. Pik Kwan Rivera, CEMS Program Manager, to attend or host, a CEMS Experts Training course. For further information or answers to any questions about CEMS Experts Training, contact 202-372-1354 or [pik.k.rivera@uscg.mil](mailto:pik.k.rivera@uscg.mil).





## **Upcoming Coaches' Training information**

**Salyers Solutions, LLC**  
Instructor: Jo Ann Salyers  
[salyers\\_solutions@hughes.net](mailto:salyers_solutions@hughes.net)

504-236-4962

Ashland, KY – June 2-3  
Norfolk, VA – June 23-24  
Ashland, KY – July 7  
Mobile, AL – July 20-21  
Houston, TX – August 17-18

**Kirby Corporation**  
Contact: Ms. Kelly Parker  
[Kelly.Parker@kirbycorp.com](mailto:Kelly.Parker@kirbycorp.com)

713-435-1775

Channelview, TX – April 23-24  
Baton Rouge, LA – May 28-29  
Channelview, TX – June 4-5  
Channelview, TX – July 16-17  
Channelview, TX – August 27-28  
Baton Rouge, LA – September 10-11  
Channelview, TX – October 15-16  
Baton Rouge, LA – November 19-20  
Channelview, TX – December 21-22

## **Upcoming Experts' Training Information**

Contact Ms. Pik Kwan Rivera for information

### **CEMS Website**

<http://www.uscg.mil/hq/cg5/cg5211/cems.asp>