



## Fatigue and the modern seafarer

Quality of sleep can be as important as quantity in reducing fatigue and sleep quality can be affected by sleep disorders. Should owners and crew managers be taking a closer look at the sleep apnea diagnosis and available treatment responses? The answer appears to be a resounding yes!

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As is well documented, “fatigue degrades a person's cognitive skills by slowing reaction time, reducing vigilance, and adversely affecting decision making, all skills necessary for effective navigation and vessel system diagnosis. Research has shown that people need about eight hours of sleep a day and receiving less than that can lead to fatigue-degraded performance. Accident investigations have linked mariner errors to their fatigue.” ( [Fatigue in Marine Accident Investigations](#) , Barry Strauch; ScienceDirect, 2015.)

Fatigue related accidents are as significant a problem today as they were in 2002 when Gard first published an Insight article on the topic: [Are we tired of hearing about fatigue-related casualties?](#) .

Fatigue is caused by a range of factors such as stress and excessive work load but is also very much affected by a person’s ability to “sleep well”. In addition to environmental factors such as noise and vibrations, a seafarer’s quality, quantity and continuity of sleep is very much affected by the typical onboard work schedules. Accordingly, fatigue management strategies commonly begin with determining operational workload requirements and matching onboard manning levels and onshore support resources, combined with efficient management of workload and hours of work and rest on board the ship.

However, a variety of sleep disorders are also known to disrupt the quality of sleep and make it impossible to obtain restorative sleep, even when individuals spend enough time trying to sleep. The most common sleep disorders are sleep apnea, insomnia, restless legs syndrome, shiftwork sleep disorder and narcolepsy. Sleep disorders pose a particular risk for seafarers, as maritime operations already expose seafarers to restricted sleep.

With studies concluding that fatigue plays a significant role in marine casualties, it is no surprise that the shipping industry is looking for an evidence-based response plan. Here we discuss sleep apnea - a disorder which often goes undetected and therefore untreated – to the detriment of individual crew members and, inevitably, to the safe operation of the vessel.

Sleep Disorder Breathing (SDB) describes two main disorders:

- Obstructive Sleep Apnea (OSA) which is characterized by repeated episodes of upper airway obstruction during sleep.
- Central Sleep Apnea (CSA) which is characterized by a lack of respiratory drive, resulting in breathing instability and pauses. CSA is associated with patients with existing cardiovascular or neurological diseases.

We will focus on the first disorder, OSA, as it is by far the most common. As is well documented in the medical journals, OSA has a significant causative correlation with arterial hypertension, cardio-vascular disease, coronary heart disease and an independent risk factor for stroke. There is additional medical research indicating possible connections to atrial fibrillation, heart failure and diabetes (further studies are being done). All these illnesses are serious, leading to very significant disability and an untimely death.

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Proper diagnosis of OSA is simple, involving only one night of sleep connected to sensory medical equipment. Once the diagnosis is made, treatment is also simple and effective. The C-PAP machine is the primary medical tool and is available world-wide. The C-PAP is a mask worn at night connected to a machine which intakes air, pushes it down the connecting tube and into the mask. The resulting increase in air pressure forces the patient's airway open and keeps it open so long as the machine senses the blockage in the throat (which is done by measuring the relative pressure of in breaths and out breaths).

Another tool to address sleep apnea is a custom-made dental retainer which forces the lower jawbone upwards and away from the throat area, thereby increasing the radius of the airway and minimizing closure during sleep. Both tools have been shown to reduce obstructive airways when used properly. Both are easy to transport when a seafarer travels to and from the vessel.

It is also worth noting that the IMO Sub-Committee on Human Element, Training and Watchkeeping (HTW) has finalized a set of revised guidelines on fatigue which will, pending approval by the Maritime Safety Committee (MSC) during its next meeting in December 2018, assist shipowners and operators in tuning their fatigue management strategy. A copy of the draft MSC Circular outlining the revised guidelines is available [IMO-HTW-Draft%20MSC-Circular-Fatigue.pdf](#). When adjustment to manning levels, operational workload requirements and rest periods do not reduce fatigue in an individual case, we recommend that the employer consider testing for sleep apnea and, if found, provide the C-PAP or retainer to those who suffer from this sleep disorder. Treating sleep apnea will not only improve the quality of life for the individual seafarer. It will also make the ship operations more safe for all those on board and should hopefully reduce the occurrence of casualties that are due to human error.