

# Down with six on/six off

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The six hours on/six off watchkeeping system is deeply flawed and unfit for purpose.

It is time to put an end once and for all to the commonly acknowledged 'truth' that the six hours on/six hours off (six on/six off) watchkeeping system is an acceptable work practice.

I do not believe I am alone in considering this practice, piracy aside, the bane of shipping today. It can result in events which may seem not only improbable, but downright unbelievable. In a report from the UK Marine Accident Investigation Branch (MAIB) on the grounding of a vessel in 2008, for example, we read: 'It is probable that the chief officer fell asleep shortly after taking over the watch at midnight, and then remained asleep for more than three hours until the vessel grounded.'

It is hard to find another trade or industry that has its members work on such a retrograde, counterproductive and outright dangerous schedule. Yet this system is accepted by IMO, the International Labour Organisation (ILO), flag state administrations, ship-owners and operators and even watchkeepers as a matter of course. But to do away with this, it is worth first looking at how it came about, and how it continues to be implemented.

### Work/rest in context

In 1958, the ILO Convention C109 defined 'normal hours of work'. For watchkeeping officers on near-trade ships at sea these normal hours of work were to be not more than 24 hours in any period of two consecutive days. Alternately, watchkeepers on distant trade ships, while at sea, had their normal hours of work set at not more than eight hours in any one day. Anything more was considered overtime – so minimum rest periods were still an illusion.

These early initiatives, however, lacked a broad application as few countries ratified the conventions. In 1996, ILO 180 was adopted and later ratified by a good many countries, albeit mostly in the

European sphere. This convention finally established that minimum hours of rest should not be less than 10 hours in any 24 hour period and 77 hours in any seven-day period

As far as hours of rest are concerned, however, both ILO 180 and the similarly worded Marine Labour Convention 2006 that will soon supplant it were superseded by STCW 1978. This IMO convention entered into force in 1984 and enjoyed many more signatories than the ILO initiative. The same 10 hour minimum rest in any 24 hour period was echoed in STCW but total hours of rest in any seven-day period were set at a less favourable 70. Yet nestled within both these conventions was a fatal flaw. Both conventions specified that the hours of rest may be divided into no more than two periods, one of which shall be at least six hours in length.

### The weak point

While 10 hours of rest are highly commendable, having only six hours of 'guaranteed' continuous rest certainly is not. Let's have a closer look to see why this is the weak point of the whole affair.

It has been shown in study after study over the last 50 years that human beings need seven to eight hours of continuous sleep for that sleep to be restorative. Without adequate restorative sleep, they cannot perform optimally. According to authors Smith, Allen and Wadsworth from their paper *A Comparative Approach to Seafarers' Fatigue*, while a six hour sleep period may be adequate for one day, it is not sufficient on a regular basis. They concluded that anything less would lead to accumulated sleep debt and will impact on performance.

In other transport sectors, such as aviation and trucking, six on/six off work schedules are no longer condoned. In some cases, they never were. For example, in many countries bus drivers are permitted to work up to 14 hours in one day, but they must receive at least eight consecutive hours off duty before starting a new shift. This requirement ensures sufficient consecutive hours of rest.

Seafarers, however, are expected to carry out their duties safely even if they have had fewer consecutive hours of recuperative sleep than most human beings need.

Study after study highlights the dangers of this approach. Take, for example, the 2007 field study by Lützhöft et al *Fatigue at Sea: a Field Study in Swedish Shipping*. This found that OOWs working on the six on/six off system are more tired than those working the four hours on/eight hours off system.

Another study conducted by the Accident Investigation Board of Finland looked at 10 marine accidents where the state of alertness had either a clear or apparent causal relationship to the accident. This study found that seven of the ten vessels involved were operating on a six on/six off system. Finally, a 2003 MAIB bridge watchkeeping study found that, in eight of the nine fatigue-related accidents reviewed, only two watchkeeping officers were carried.

### A major anomaly

One of the major problems with abolishing the six on/six off schedule is that it appears to be in line with STCW, because the hours of rest are divided into no more than two periods, 'one of which shall be at least six hours in length'. In fact, there is a major anomaly between practice and theory in this area that means it is anything but.

Section A – VIII/2 of STCW requires the relieving officer to ensure his vision is fully adjusted to the light conditions before taking over the watch. In practical terms this means that during the hours of darkness an officer or rating (lookout) must come up to the bridge at least 10 minutes before their watch begins. This section of STCW also stipulates that prior to taking over the watch the relieving officer shall:

- Be satisfied of the ship's estimated or true position;
- Confirm its intended track, course and speed and UMS controls as appropriate;
- Shall note any dangers to navigation expected to be encountered during their watch.

Relieving officers also have to personally satisfy themselves regarding the:

- Standing orders and other special instructions of the master relating to navigation of the ship;
- Position, course, speed and draught of the ship;
- Prevailing and predicted tides, currents, weather, visibility and the effect of these factors upon course and speed;

- Procedures for the use of main engines to manoeuvre when the main engines are on bridge control;
- The operational condition of all navigational and safety equipment being used or likely to be used during the watch;
- The errors of gyro/magnetic compasses;
- The presence and movement of ships in sight or known to be in the vicinity;
- The conditions and hazards likely to be encountered during the watch;
- The possible effects of heel, trim, water density, and squat on under-keel clearance.

This means that even in daylight watchkeepers must come to the bridge at least 10 minutes early every watch. Clearly, it is mathematically impossible for relieving officers to uphold, on the one hand, their duties when taking over a watch, and on the other the requirements for six consecutive hours of rest, when working a six on/six off regime.

In 2006, the World Maritime University produced a report (*Fatigue at Sea: A Review of Research and Related Literature*) suggesting that a literal interpretation of the STCW is problematic. It said that while STCW 95 provided some specific regulation and interpretation guidance, economic factors – primarily the reduction in crew sizes – lead to literal interpretation of these regulations. ‘As a result, fatigue continues to be cited as a primary factor in marine related accidents.’

I would suggest that interpretations that allow the six on/six off schedule are not ‘literal’ – they are wrong. Under a six on/six off regime it is impossible for watchkeepers to obtain six consecutive hours of rest, let alone the seven to eight hours a human being needs.

## The economics

The moving of goods by sea is already the most economical form of transport on the planet. Yet shipping practices would have us

squeeze the margins still further. The six on/six off schedule is employed worldwide for very simple reasons. It conforms to the lowest common denominators, allowing operators to cut crewing – and costs – to the minimum. But if the lowest common denominator is raised, the increased cost of safer ships is simply passed on to the consumer. And the unit cost increase for the additional crew needed would be small. How much more would your breakfast porridge cost per bowl if three watchkeepers were employed instead of two?

Although employing three watchkeepers would be the ideal solution, it is not the only one. Awareness of the problems associated with six on/six off schedules has resulted in some vessels

modifying their watch systems to permit eight hours of rest as documented in the US Coast Guard Crew Endurance Management Newsletters, Vol 4, Issue 1 (2007) and Vol 2, Issue 1 (2004).

The six on/six off watchkeeping system continues to enjoy tacit acceptance due to what some may consider a literal interpretation of STCW. In practice, it is inherently contradictory to essential rest requirements within STCW. This system promotes fatigue and contributes to performance degradation, thus increasing risks. It should not be tolerated, either on ethical, scientific or economic grounds. For all these reasons, and most of all for the sake of safety, it is time to bring this system to an end.

## The fatigue forum

The Nautical Institute continues to campaign against the two watch system. For further information and discussion, visit The Nautical Institute’s fatigue forum: [www.nautinst.org/fatigue/index.htm](http://www.nautinst.org/fatigue/index.htm)

Fatigue on board ships leads to accidents and incidents and left unchecked, will create an environment where the retention of qualified crews will be increasingly difficult. Due to a culture where there can be a general disrespect for regulations (not to be confused with the compliance culture) and the ‘can do’ attitude of seafarers, it is difficult to gauge the extent of the problem because work/rest hour logs do not reflect a problem. However, anecdotal evidence constantly reported to The Nautical Institute indicates that fatigue and manning levels are of major concern to mariners. In response to this the Institute has begun work on a programme to raise the awareness of

fatigue on board and promote best practices for management and mitigation techniques.

The purpose of this forum is to facilitate this by providing links to reports and resources concerning fatigue and its effects on mariners, and by providing a means for mariners to express some of their concerns in a safe environment. The reports of on board fatigue on the forum are to illustrate the types of environments some mariners are facing. These reports are simply illustrative and should be taken as ‘hypothetical examples’.

All mariners are encouraged to report issues relating to fatigue to The Nautical Institute either as a hypothetical example and/or confidentially. We also encourage all those in the industry to use these reports to better acquaint themselves with these realistic situations in order to promote practical solutions.

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