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TRAINING AND WATCHKEEPING
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ROLE OF THE HUMAN ELEMENT

Seafarer Fatigue, Minimum Manning and the Mitigation of Fatigue

Submitted by the Nautical Institute and the
International Transport Workers' Federation

SUMMARY

Executive summary: The report of the forty-fourth session of the STW Sub-Committee (STW 44/19) stated that seafarer fatigue is an issue of serious concern and needed to be discussed urgently and that the Human Element Working Group needed to address fatigue in the context of hours of work, hours of rest and minimum safe manning. This document takes into account the discussions at STW 44 and provides information on its relation to the major area of concern to seafarers, in particular the master/chief mate two-watch system.

Strategic direction: 5.4

High-level action: 5.4.1

Planned output: No related provisions

Action to be taken: Paragraph 28

Related documents: STW 44/19; resolution A.772(18); resolution A.890(21); resolution A.1047(27); MSC/Circ.1014; SOLAS regulation V/14 and ISM Code

Introduction

1 At the forty-fourth session of the STW Sub-Committee (STW 44) (29 April to 3 May 2013), the delegation of the United Kingdom submitted a document related to Project Horizon on seafarer fatigue, which provided information on research on seafarer fatigue.

2 Project Horizon highlighted the issue of the master/mate 6-on/6-off watchkeeping issue, and in the discussions that followed the following views were expressed:

- .1 the results of Project Horizon provided a scientific analysis based on objective research that deserved further consideration;

- .2 seafarer fatigue is an issue of serious concern and needs to be addressed urgently;
- .3 the fatigue study has provided valuable information regarding tiredness and the cognitive performance of watchkeepers;
- .4 the Human Element working group needs to consider fatigue in the context of hours of work and rest and minimum safe manning; and
- .5 existing guidelines promulgated by the Organization relating to fatigue need to be revised.

3 In light of the above, STW 44 invited Member Governments to submit to MSC 93 proposals for an unplanned output for a holistic review of the issues relating to fatigue.

4 This document highlights that in most instances where a company applies for, and an Administration approves, the implementation of a 6-on/6-off master/mate watchkeeping system for a particular vessel neither body is fulfilling their obligations and responsibilities in respect of resolution A.890(21) on *Principles of safe manning* and of clause 6.1.3 of the ISM Code. The effect of this is that the master of the vessel cannot safely carry out his obligations in respect to keeping a proper watch (STCW Convention, regulation A-II/I) as well as comply with all other Administration and company imposed duties and stay within his/her hours of rest and work.

Minimum safe manning levels

5 The IMO *Guidelines for the application of principles of minimum safe manning* (resolution A.1047(27)) indicate the factors to be considered when determining minimum safe manning levels, the responsibilities of companies in preparing a proposal for the minimum safe manning level of one of their ships and how an administration should evaluate such proposals prior to approval. Of particular note are sections 2, 4 and 5 which explain the company's obligations and responsibilities in preparing such a proposal and the factors an Administration should consider when deciding whether or not to approve the proposal taking into account the guidance in resolution A.1047(27) as required by SOLAS V/14. Often when incidents occur on vessels, the investigation finds that these guidelines have not been taken into account or fully complied with.

6 The STCW Code, as amended, states in section A-VIII all the duties of the watchkeeping officer. Maintaining a proper watch and lookout precludes all other duties such as, but not limited to, cargo related paperwork, safety drills, chart corrections, maintenance activities and safety compliance activities. Section A-VIII also requires 77 hours of rest in a seven-day period. With 12 hours on watch and a minimum of 10 hours of rest in any 24-hour period that leaves only an average of one hour a day for all other work related to the administration, maintenance and operation of the ship, it is clear that work is either being performed on watch, which interferes with keeping a proper lookout or is being performed during mandatory rest periods which interferes with required recuperative rest to combat fatigue. Complying with STCW watchkeeping duties also entails the master being notified and often called to the bridge in all situations described in A-VIII-Part 4-1/14 and in other situations which may be noted in the company SMS.

7 The ISM Code specifically states in 6.1.3: "The company should ensure that the master is given the necessary support so that the master's duties can be safely performed." With only two watchkeeping officers, one of whom is the master, who must be called to the bridge outside of his normal watchkeeping hours as mentioned in the previous paragraph,

the company is practically ensuring that the master cannot comply with the required hours of work and rest. The company also creates a situation in which a mate, who is in doubt about a situation he/she is facing, will hesitate and often decide not to waken the master as it means disturbing what little sleep the master will manage to get in his off-hours.

8 Minimum safe manning levels that allow small ships to carry five or six crew members in total also creates a situation where ABs are not kept as lookouts on the bridge at night, as is required for maintaining a proper watch, since it will reduce their ability to safely engage in necessary, and often physically demanding, cargo and/or maintenance work throughout the day. The hours of rest and work are often fraudulently noted in order to avoid any problems should port inspectors check them.

9 Establishment of a minimum safe manning level directly relates to the number of hours which each crew member is required to work. Unrealistic minimum manning levels that do not address actual operational demands placed on seafarers are resulting in too few crew members, who are then required to work excessive fatigue-inducing hours.

10 In no other profession, let alone a safety critical one, is it permitted for a person to work up to 91 hours per week for months on end. On a 6 hours on/6 hours off watchkeeping system crew members work a minimum of 84 hours a week. The ILO/STCW working hours are meant to be maximum limits, not recommended norms. In the European Union, crew members are allowed to work the maximum hours as specified by ILO/STCW regulations. However, in some other countries, a 40-hour week is the regulated amount of time a seafarer may work, with limits on overtime.

11 In other transport industries working hours are more strictly regulated. HGV drivers in European Union countries may not drive more than 56 hours in a week with a total of no more than 90 hours over a two-week period. It is recommended that train drivers in the European Union not exceed 80 hours of driving time over a two-week period and around the world air transport flight-hour limits vary between 700 and 1000 hours annually.

12 A seafarer who works a 6-on/6-off watch schedule with equal time on leave for time on board and keeps to his watchkeeping hours only, will work over 2,000 hours annually. Seafarers, who do not have equal time on leave for time on board, will work even more hours. If a seafarer works two months on board and one month on leave, they would work over 3,200 hours.

13 Since it is possible to gain an economic advantage by operating with minimum manning levels, some companies submit proposals that may be sufficient for a passage of open sailing but which are insufficient for maintenance, port operations including cargo, ship inspections, regulatory compliance, administrative tasks and a real emergency situation. The two references below take the reader to incident investigation reports that show that the manning level was not adequate for the watchkeepers to be able to comply with their watchkeeping duties, as set out in the STCW Code section A-VIII/2 part 4, and carry out all other duties required by both the company and the Administration.

Analysis of the issue

14 Fatigue has been a major topic of discussion in relation to seafarers since the **Exxon Valdez** incident in 1989.

15 In 1993, IMO resolution A.772(18) provided a general description of fatigue and factors contributing to fatigue were identified.

16 In 2001, IMO approved MSC/Circ.1014 on *Guidance on fatigue mitigation and management*.

17 In 2004 the MAIB issued a Bridge Watchkeeping Study¹ which suggested a correlation between the 6-on/6-off master/mate watchkeeping system and an increased risk of an incident occurring. For the period between 1994 and 2003, 66 incidents involving 75 ships were analysed to reveal the following: a third of all groundings involved a fatigued officer alone on the bridge at night; two thirds of all the vessels involved in collisions were not keeping a proper lookout, and a third of all the accidents that occurred at night involved a sole watchkeeper on the bridge.

18 In 2005 Sweden submitted a document to MEPC 53 (MEPC 53/INF.7) that discussed fatigue as a causal factor in collisions and groundings in Swedish waters. The document raised particular concerns about the large number of groundings in the Sound between Denmark and Sweden. At its narrowest point it is some two nautical miles wide. The document stated: "In the last six years, seven ships have run aground in the Sound in sleep/fatigue related accidents. How many more ships have gone through the Sound with the OOW drowsy, exhausted, half-asleep or asleep without having run aground or been involved in a collision? Considering the very dense traffic, this is a very serious safety problem." The document concluded that two-watch systems employing only two navigators were probably in many cases unsafe.

19 In 2007 a further Swedish study carried out by the Swedish National Road and Transport Research Institute stated in its summary: "There are higher levels and effects of fatigue on two-watch ships...Tendencies suggest that participants in the two-watch system more often get less than six hours sleep a day, more often nod off and more often fight against sleep than participants in the three-watch system."

20 In 2010, responses by the membership of The Nautical Institute to the questionnaire circulated in preparation for the 2011-2015 Strategic Plan revealed that seafarer concern about both fatigue and manning levels had risen sharply. In the 2005 questionnaire, 60% and 64% of members had expressed concern about manning levels and fatigue, respectively. By 2010 the levels had jumped to 85% and 90%. The Nautical Institute has a membership of 7000+.

21 STW 44, in its report to the Committee (STW 44/19) stated that "the results of Project Horizon provided a scientific analysis based on objective research that could assist in preventing maritime accidents and deserved further consideration." Some of the findings of Project Horizon as well as those mentioned previously include the following:

- .1 those on a 4 hours on/8 hours off system had a relatively normal sleep pattern. However, those on a 6 hours on/6 hours off system were found to get markedly less sleep;
- .2 the 6 hours on/6 hours off system was found to be more tiring than the 4 hours on/8 hours off system and disturbed watch periods produced significantly high levels of tiredness;

¹ MAIB Report No 14/2006 – Report on the investigation into the grounding of **MV Lerrix** off the Darss peninsula, Baltic Sea, Germany, 10 October 2005, pages 23-24
http://www.maib.gov.uk/publications/investigation_reports/2006/lerrix.cfm; MAIB Report No 7/2009 – Report of the investigation of the grounding of **Antari** near Larne, Northern Ireland, 29 June 2008, page 9
http://www.maib.gov.uk/publications/investigation_reports/2009/antari.cfm.

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- .3 more sleep whilst on duty was found to occur on watch in the 6-on/6-off system than in the 4-on/8-off system;
 - .4 the onset of tiredness on 6-on/6-off occurred over a shorter time frame than predicted; and
 - .5 special attention needs to be paid to the risks in passages through difficult waters in combination with the 6-on/6-off watch system because of loss of sleep.

22 In April 2013, the cargo ship **Danio** ran aground in an environmentally sensitive area off the UK Northumberland Coast. Bridge watches were being kept by just the master and mate. In MAIB Report Number 8/2014, the UK Marine Accident Investigation Branch (MAIB) recommended that the maritime and Coastguard Agency (MCA) work closely with the European Commission and EU Member States to propose to the International Maritime Organization (IMO) that all vessels engaged on short sea trades carry a minimum of two navigational watchkeepers in addition to the master.

23 Fatigue, its causes and how best to address it has been the subject of prolonged discussion at IMO. However, as can be seen from all the above evidence, the 6-on/6-off watchkeeping system in combination with only two watchkeepers, one of whom is the master, can not only be linked to a higher risk of incidents, particularly at night, but does not allow the master to comply with all statutory and company requirements within his hours of work.

The Way Forward

24 Manning levels need to be addressed in a realistic way that prevents gaining competitive advantage from manning levels that do not meet the actual safe operating conditions of the ship. Such manning levels, if permitted by flag States, place ships and seafarers at risk and create risks to the environment and property that are primarily borne by coastal and port States. Such an approach must consider more than the bare minimum levels necessary to navigate a vessel under ideal conditions; rather it must address the need for maintenance, port operations including pilotage, mooring, cargo, ship inspections, regulatory compliance including drills associated with security and environmental issues, administrative tasks and real emergency situations.

25 The explicit expectation by shoreside management and flag State administrations that their ships' crews observe the hours of work and rest laid down by regulation must be matched by operational and regulatory policies that allow them to actually be observed.

26 Resolution A.1047(27) recognized that safe manning levels were an ongoing problem in the industry that would require further attention and requested the Maritime Safety Committee to keep the resolution under review and amend its provisions as necessary. In keeping with the Assembly's request, consideration should now be given to eliminating the master/mate two-watch system by an amendment to resolution A.1047 (27), annex 5, stating that in determining minimum safe manning for any ship, the master shall not be considered as part of the normal watchkeeping capability of the ship.

Summary

27 Global concern with the extent of seafarers fatigue is widely evident everywhere in the shipping industry. This has also been expressed by serving seafarers who feel that the master/mate two-watch system is inherently unsafe and does not allow the officer and

master to fulfil all the duties necessary for the safe operation of the ship. Given the concern of practicing seafarers and the number of incidents/accidents involving ships with this manning it is now time to seriously consider the removal of the master/mate two-watch system and ensure that the ship's master is not considered part of the normal watchkeeping capability of the vessel. Adoption of this proposal would address the concerns of seafarers, minimize the risk of fatigued officers falling asleep whilst on watch, reduce the risk of harm to the marine environment and reduce the risk to the safety of seafarers.

Action requested of the Sub-Committee

28 The Sub-Committee is invited to note the information provided.
