

The International Maritime Human Element Bulletin

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Alert!



A need to address human element issues effectively

Regulation is required to ensure safer and secure shipping and cleaner oceans; and for the setting of common standards for ship and system design and build, for the education and training of the various stakeholders, and for operational procedures. The seafarer also needs to be protected through regulation that can provide him/her with a safe and secure working environment,

decent working and living conditions, fair terms of employment and a healthy lifestyle.

Those who are involved in the development of international, regional and national maritime conventions and instruments related to the safety of life and property at sea and the protection of the marine environment, need to be sensitive to the human element – as do those who are responsible for ensuring the implementation of such conventions and instruments, particularly when translating them into local rules and regulations.

The IMO, in its Resolution A.947(23), defines the human element as *'a complex multi-dimensional issue that affects maritime safety, security and marine environmental protection' which involves 'the entire spectrum of human activities performed by ships' crews, shore-based management, regulatory bodies, recognized organizations, shipyards, legislators, and other relevant parties'*. And, it urges all parties to cooperate to address human element issues effectively.

Three years ago, the IMO introduced their **Checklist for considering Human Element issues by IMO bodies** (IMO

MSC-MEPC.7/Circ.1) for completion by all relevant IMO bodies before approving or adopting amendments to mandatory and non-mandatory IMO instruments; member governments were also encouraged to complete this checklist before submitting proposals for development or amendments to IMO instruments.

Whether this checklist is being rigidly followed remains to be seen, but it is nevertheless a step in the right direction and ought to be the benchmark for addressing the human element in the development and implementation all international, regional and national maritime conventions and instruments, and for the development of company rules and regulations.

But, fundamental to this is the need for all international regulators, national legislators and administrations, shipowners and shipmanagers to have a thorough understanding of the many and varied human element issues that relate to the design and operation of ships and their systems.

To this end, the centrespread feature in this issue of **Alert!** offers some thoughts on the development of a knowledge and skills framework for this particular stakeholder group.

Welcome to this third series of **Alert!** bulletins, for which we are most grateful to Lloyd's Register Educational Trust for their continued sponsorship. The aim of this series of bulletins is to establish what individual stakeholders in the maritime industry perceive as the required skills for addressing human element issues in their various sectors. The objective is to develop a skills framework for consideration of the human element across the maritime industry and ultimately to define a curriculum for human element awareness training.

Each bulletin will focus on a specific business area, including: regulation, administration and management; finance and insurance; design, build and maintain; health, safety, environment and quality management; technical, inspection and survey; human resources; and education and training.

Through the **Alert!** bulletins and the website, we seek to represent the views of all sectors of the maritime industry on human element issues. Contributions for the Bulletin, letters to the editor and articles and papers for the website database are always welcome.

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Alert!

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Essential skills for addressing human element issues in a shipping company

Cecilia Österman, Marine Engineer, Chalmers University of Technology

Great technological developments have transformed the societal topography onboard, just as in other industries. Many tasks previously performed by hand can now be executed faster, cheaper and more accurately using machines, enabling crew reductions as a way to minimize operation costs. Yet, the human element is an indispensable part in any work system. We are matchless when it comes to adaptability and flexibility, but we are also vulnerable to factors in our work environment that can impair our work performance if not managed properly.

In a recent study, Swedish shipowners were asked to identify the human element issues they considered most important to address in order to increase safety, productivity and well-being at sea. The answers could be categorized into six dimensions: leadership, culture,

knowledge, communication, participation and human resources; all of which influence and guide company activities and direct how decisions are made.

When limited financial margins restrict the ability to invest in new equipment and ergonomic intervention projects, a shipowner thus has power and possibility to improve the working conditions in respects less dependent on hardware. The challenge of attracting, recruiting and retaining qualified personnel, not only to the vessels, but to the industry as a whole, was claimed by the interviewed owners to be of utmost importance. To meet this challenge it is necessary to work proactively with a leadership that communicates attainable demands, and adequate control and support.

The shore-based part of the organization

must have sufficient knowledge to correctly assess the working situation onboard when implementing systems, equipment and work procedures; or as one respondent put it: "Realise that there are two ends on a piece of string – if you pull in one end, something will happen in the other end as well."

A shipowner skilled in managing these human element issues is believed to be rewarded with fewer occurrences of maritime accidents, lost time injuries and equipment downtime. A motivated, skilled crew is thought to do a better job operating and maintaining the vessel, and if an accident or breakdown happens, be better prepared for mitigation; thus limiting costs and time off-hire. And, a stimulating work environment can definitely be a competitive element.

www.chalmers.se/smt/EN/

The ILO's Maritime Labour Convention, 2006

Placing the human element at the forefront

Dr. Cleopatra Doumbia-Henry, Director, International Labour Standards Department, International Labour Office

In 2006 the 94th International Labour Conference adopted, on a tripartite basis, the 'super convention', the Maritime Labour Convention, 2006 (MLC, 2006), which brings together and updates 37 international maritime labour Conventions and related Recommendations adopted since 1920. The MLC, 2006 is comprehensive and sets international standards covering almost every aspect of seafarer working and living conditions including: minimum age, medical fitness, recruitment and placement services; career and skill development for seafarers; repatriation, social security protection, employer liability for healthcare and costs of illness; occupational health and safety; on board accommodation, recreational facilities, catering and food; wages, leave, and maximum hours of work; all combined with strong inspection and certification requirements for ships on international voyages.

The earlier maritime labour Conventions were updated in the MLC, 2006 with a view to attracting more women to this workforce and enabling the Convention to keep pace with technological and other developments.

It also introduced for the first time certification by a country (flag State) of labour conditions for seafarers on its ships that travel internationally. This certificate, and the conditions on the ship, will be subject to port State control. In addition, the MLC, 2006 requires that

ratifying countries adopt a 'no more favourable treatment' approach when dealing with ships entering their ports flying the flags of countries that have not ratified the Convention.

Once the MLC, 2006 enters into force it will affect labour conditions on ships of all countries. This will help to assure the level-playing field for shipowners and decent work for all seafarers. The importance to the shipping industry cannot be emphasized enough. It is simply common sense that **decent working conditions are essential to attracting and retaining workers in any sector**. This perhaps is even more true in the case of seafaring, where working and living conditions are one and the same on voyages.

What will entry into force of the MLC, 2006 mean for skills and training and human element issues? The ILO Global Jobs Pact, adopted by the International Labour Conference in June 2009, identified increasing equal access and opportunities for skills development, quality training and education as one of the principles for promoting recovery from the current global economic crisis. It also called for a strengthened respect for international labour standards and investment in training.

The MLC, 2006 contains a number of provisions that have implications for training and skill development. In that respect Regulation, 2.8, is particularly important as it requires the countries to

have national polices that "...encourage career and skill development and great employment opportunities for seafarers domiciled in its territory".

But, perhaps a first and most important, 'skills development' aspect of the MLC, 2006 relates to education and training about the Convention. This is needed for all key actors: flag State authorities and inspectors, Recognized Organizations, seafarers, and shipowners and their representatives. To meet this need, in addition to numerous workshop and seminars in all regions of the world, the International Labour Office, with support from interested governments and organizations has developed a 'Train the Trainers' (of maritime labour inspectors) course at the International Training Centre of the ILO in Turin, Italy.

This course is designed to help rapidly establish a global cohort of maritime professionals that have this knowledge and who can help build the essential national capacity to implement the MLC, 2006 requirements on all ships.

There is now a need to move ahead rapidly to bring the MLC, 2006 into force and to give the human element in shipping a true front and central role in the maritime industry.

A longer version of this article, together with explanatory notes, can be downloaded from: www.he-alert.org/documents/published/he00865.pdf

You could say that IMO's work on human element issues began formally in 1991 with the creation of the Joint MSC/MEPC Working Group on the role of the human element in maritime casualties, which was later renamed the *Joint Working Group (JWG) on the Human Element*. Actually, IMO had been working on human element issues long before that - just think of the STCW Convention. What is true, however, is that the work has not been carried out in a very structured and holistic manner.

What is the situation now 18 years after the establishment of the group? In order to evaluate that, we should look at human element issues firstly from a practical/technical/operational angle, and then from a visionary/philosophical angle. The former could be seen as the 'easy' part. For example:

During the Group's first years of work it concentrated primarily on matters related to safety management, Port State Control (PSC) on operational requirements and development of a common structure for

shipboard emergency plans. The practical results of this work were, *inter alia*, the ISM Code and amendments to the guidelines on PSC.

The ISM Code has been attacked by many: it has been called a 'paper tiger', 'toothless', 'superbureaucratic' etc. It seems to me that many of the critics have not really read the Code or they have not understood the basic principles - some may not want to understand! The Code is not to be seen as the solution to all problems - but it is a valuable step forward. One basic and general principle is 'Keep it simple!'

In another part of IMO, the Sub-Committee on Bulk Liquids and Gases (BLG) has developed Guidelines on the Basic Elements of a Shipboard occupational health and Safety Programme. The Guidelines were approved by the IMO Committees and issued as MSC-MEPC.2/Circ.3 in June 2006. The impact on the industry of these guidelines is unknown to me, but it would be interesting if someone could have a look at it.

The visionary/philosophical angle has been more difficult. The JWG has developed a number of documents, among which is Resolution A.947(23) - *Human Element Vision, Principles and Goals for the Organization*. This resolution has been supplemented by several circulars (MSC-MEPC.7 series).

One of the circulars provides a checklist to be completed by all relevant IMO bodies before approving or adopting amendments to mandatory and non-mandatory IMO instruments. Member Governments are also encouraged to complete this checklist before submitting proposals for development or amendments to IMO instruments and submit a completed checklist accompanying relevant proposals.

To the best of my knowledge, no systematic analysis has been carried out to evaluate the results of the use of the checklist. This might be a worthwhile exercise.

A longer version of this article can be downloaded from: www.he-alert.org/documents/published/he00870.pdf

Focus on seafarer education and training

Professor Liu Zhengjiang, Vice president of Dalian Maritime University

Starting from the beginning of the 1990s, IMO put the human element on the agenda of its meetings and set up human element working groups that held discussions on the effects of the human element and prevention of human element related accidents. It incorporated its working results into amendments of conventions and regulations. Currently IMO is carrying out a comprehensive review of the STCW Convention and STCW Code. It is against this background that I emphasize the following aspects to show the importance of the human element in higher maritime education and training.

Enhance seafarers' marine environment protection awareness: Marine pollution accidents are more or less related to the lack of marine environment protection awareness of some seafarers. Now and then seafarers are found to discharge pollutants illegally into the sea. As a seafarer training institution, Dalian Maritime University (DMU) is working hard to enhance the marine environment protection awareness of our students - future seafarers, which swims with the trend of the times.

Put more emphasis on the communication ability of seafarers: Accidents like collision, grounding and contact are often the result of poor or ineffective communication among captain and pilot, crew members, different ships or VTS centres. The new STCW 78/2010 amendments will require that seafarers have the ability to "understand the principles of, and barriers to, effective communication between individuals and teams within the ship, and to establish and maintain effective communications". We must therefore work out practicable ways to implement such requirements.

Focus on the fostering of ship resources management competence: Accidents show that some ship operators worked neither as a team during the process of ship manoeuvring, nor took full advantage of ship resources. Therefore, fostering seafarers' ship resources management competence and their 'team' spirit is a matter of great urgency. In the amendments to STCW78/2010, the training requirement on 'bridge resource management (BRM)' and 'engine resource management (ERM)' are made mandatory. Seafarers are required to have the "knowledge of shipboard personnel management and training; knowledge and ability to apply effective resource management; knowledge and ability to apply decision making techniques; ability to apply task and workload management." It is of great importance to focus on seafarers' ship resources management competence in our training plan.

Train seafarers with stronger bridge information processing ability: If seafarers are not given sufficient training on the use of integrated bridge systems or other sophisticated onboard equipment, the advance of marine technology may lead to more accidents rather than less. To ensure the safety of navigation and avoid human errors brought about by the improper use of new technology, it is necessary to provide training on "the use of information from navigational equipment for maintaining a safe navigational watch" as specified by the new amendments of the STCW Convention.

Strengthen the training of seafarers' ability against piracy: Many cases of piracy incidents point to the lack of anti-piracy awareness of seafarers. IMO has realized the significance of this issue and incorporated regulations on basic security awareness, knowledge and skill training of seafarers into new STCW amendments (Regulation VI/1 and VI/6). Anti-piracy skill training is an urgent task as well as a long-term focus. DMU, along with other maritime training institutions, will take this as a priority in our teaching syllabus.



International Regulator

- consider the human element
- take input from seafarers or their proxies, during the development or amendment process related to any Resolution, Instrument or Circular
- provide guidance on the human element aspects of the application and/or implementation of any proposed solution being provided for Administrations, ship owners/managers, seafarers and surveyors
- provide safeguards against single person errors and organizational errors
- present information for seafarers in a form that can be presented to and is easily understood by the seafarer
- consult human element experts in the development of solutions
- set the necessary levels of knowledge, skills, abilities and experience for personnel employed in the maritime sector to properly perform job tasks,
- properly manage risks through management systems, programmes, procedures, policies, training, documentation, equipment, etc.
- be aware of the necessary conditions to sustain the safety, health and comfort of those working on board
- reduce the risk of illness, injury, or death in the event of a catastrophe such as fire, explosion, spill, collision, flooding, or intentional attack
- consider desired human performance in emergency situations for detection, response, evacuation, survival and rescue and the interface with emergency procedures, systems, facilities and equipment
- provide detailed mandatory standards of competence and other mandatory provisions necessary to ensure that all seafarers are properly educated and trained, adequately experienced, skilled and competent to perform their duties in a manner which provides for the safety of life and property at sea and the protection of the marine environment

- prevent and suppress terrorism against ships and improve security aboard and ashore, in order to reduce the risk to passengers, crews and port personnel on board ships and in port areas, to the vessels and to their cargoes
- provide practical guidelines for the investigation of human factors in marine casualties and incidents
- establish and require the enforcement of, principles and rules which ensure a uniform minimum international standard for the safety of life at sea

Legislators/ Administrations

Fully understand:

- the importance of the requirements of pertinent IMO, ILO, WHO and regional instruments relevant to maritime safety and protection of the marine environment
- the essential importance of properly addressing the human element for safety of life at sea, safety of navigation and protection of the marine environment
- the need to promote safety of life at sea by establishing and requiring the enforcement of, principles and rules which ensure that a uniform national standard is maintained, at least in line with the required minimum international standard

Be fully conversant with and fully understand the need to implement:

- the international standards on ship safety, human security and quality ship management in the context of SOLAS 1974 (as amended); the International Regulations for Preventing Collisions at Sea, 1972 (as amended); and STCW 1978 (as amended)
- the contents of the ILO Maritime Labour convention 2006 (MLC, 2006)
- the rights, obligations and procedures to ensure international health security, within the context of the International Health Regulations 2005 (IHR)
- other regional instruments relevant to maritime safety and protection of the marine environment

- measures to prevent/suppress terrorism against ships and to improve security aboard and ashore, so as to reduce the risk to passengers, crews and port personnel and to the vessels and their cargoes, in accordance with the requirements of the ISPS Code

Recognize the need to:

- investigate human factors in marine casualties and incidents, and act on the findings
- properly consider the human element when developing/amending national maritime instruments related to safety, security and protection of the marine environment

Shipowners/ Shipmanagers

Fully understand

- the essential importance of properly addressing the human element for safety of life at sea, safety of navigation and protection of the marine environment
- the importance of safety at sea, prevention of human injury or loss of life and avoidance of damage to the environment, in particular to the marine environment/property
- that the cornerstone of good safety management is commitment from the top
- the importance of safety at sea, prevention of human injury or loss of life, and avoidance of damage to the environment, in particular to the marine environment and to property, in accordance with the requirements of the ISM Code

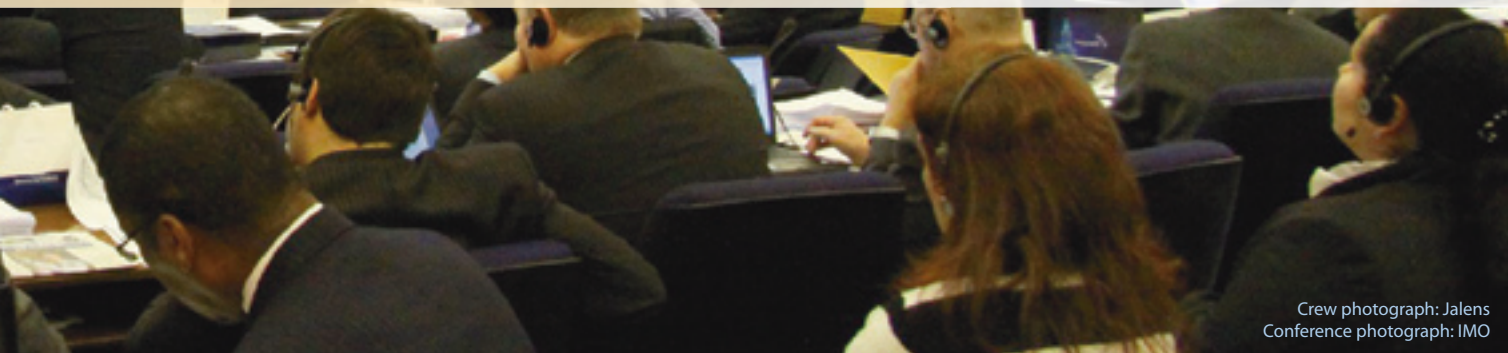
Fully understand the need to:

- establish and communicate a policy for the human-centred approach to ship design/operations
- have a policy for using human element data
- maintain increased awareness of usability
- facilitate personal and technical interactions on human element issues

- seek and exploit expert guidance and advice on human element issues
- perform research to develop human element data as it is required
- develop or provide relevant staff with human element skills
- develop a plan to achieve and maintain the optimum level of usability throughout ship operations
- identify the specialist skills required and plan how to provide them
- manage a lifecycle plan to address HE issues

Be fully conversant with and fully understand the need to implement:

- pertinent IMO, ILO, WHO and other regional instruments relevant to maritime safety and protection of the marine environment
- the international standards on ship safety, human security and quality ship management in the context of SOLAS 1974, the International Regulations for Preventing Collisions at Sea, 1972 (as amended); and STCW 1978 (as amended)
- the ILO Maritime Labour convention 2006 (MLC, 2006), in respect of seafarers' employment and social rights to ensure a safe and secure workplace that complies with safety standards; fair terms of employment; decent working and living conditions on board ship; health protection, medical care, welfare measures and other forms of social protection
- the obligations and procedures to ensure international health security, within the context of the International Health Regulations 2005 (IHR)
- other regional instruments relevant to maritime safety and protection of the marine environment
- measures to prevent/suppress terrorism against ships and to improve security aboard and ashore, in order to reduce the risk to passengers, crews and port personnel on board ships and in port areas and to the vessels and their cargoes, in accordance with the requirements of the ISPS Code



A shipowner's perspective on the human elements skills required in shipping

Captain Robert Ferguson, Gulf Energy Maritime (GEM) PJSC

During every hour of the day in a ship's operational life its staff is making critical decisions as to the safe operation of the vessel, such as those that involve a change of course to avoid collision or attention to an engine room alarm. If a shipowner wants to sleep well at night it is having confidence in his staff that will be the best sleeping remedy, not trying to count the dollars disappearing from his bank account to repair his damaged ship. It is the human element – the people, ashore and afloat - that will operate her professionally and safely.

In terms of the human element, the tanker shipping industry it is not much different from the last century. Seafarers are still regarded as 'casual labour', placed in a 'market' where they are bought and sold. Their conditions of service are constantly whittled away. Seafaring is unattractive to young people; there has been little investment in encouraging young people to take up a career at sea and little investment in their training.

Seafaring is also becoming increasingly unattractive to existing seafarers and is often not

viewed as a long term career. All this is despite the industry's investment in the technology in new complex ships, the emphasis on safety of operations, and the increasing complexity of the global issues facing the seafarer and shore staff in the operation of the ship.

It is quite clear that any shipping company must work hard to change attitudes, to change the way the industry employs people and, very importantly, the way people work and live at sea. We as an industry have not paid enough attention to human element issues and have been reactive, mostly negatively, to those issues. The result is that the global shipping industry will suffer continued depreciation in the quality and numbers of its workforce and the world will be at increased risk from issues like pollution, the effects of local disaster and a threat to economic well being in the context of global seaborne trade.

It is a sad indicator that there is a need to introduce a Maritime Labour Convention that, in the main, deals with the basic employment rights of a seafarer and his living conditions on

board. Is that as far as we have come, in human element terms, with regard to the seafarer and shore staff as people doing a critical and important job of work to operate ships at sea?

However it is a line in the sand, and any reputable shipowner has, hopefully, not too much to learn from it. Where the shipowner should be evolving is looking at his people more closely, drawing them closer to him, establishing new and better ways of managing ships from ashore and on board, new and better ways of working and living on board. Looking after, not only the practical aspects of operating the ship efficiently and safely, but the morale, the welfare, the encouragement, the training of staff ashore and afloat, development of new entrants and satisfaction in the job.

All this is so that his business can meet the challenge and prosper. Without the development of these skills and practices, and the encouragement of new thinking, the industry will continue to stagnate on human element issues, to its detriment.

Unmasking hidden hazards - human and organizational factors

Ms. Pik Kwan Rivera, US Coast Guard Headquarters

As the commercial maritime industry invests significant resources in the protection of the human element, the management of human and organizational factors (HOF) has become fundamental to maintaining efficient and safe shipboard operations. Tangible examples of HOF include the implementation of quality management practices, effective and fair employee selection criteria, consistent minimum shipboard qualification requirements, or ensuring the use of effective technology to support crewmembers during critical operations.

The consideration and management of HOF promotes shipboard safety and crewmember professional effectiveness. As a result, cultivating the necessary company professional knowledge, skills, and abilities to address HOF has become not only a necessary, but also a critical investment.

In the case of maritime company managers and policymakers, the ability to recognize HOF issues is a critical skill-set for ensuring operational safety. The fact that shipboard and shore operations involve human interactions and a wide variety of human-machine interfaces, addressing HOF requires the application of several professional disciplines.

First and foremost, it is fundamental to recognize and understand factors impacting crewmember health and work performance, broadly referred to as 'human factors'. This understanding is necessary to minimize crewmember exposure to work demands and conditions that exceed their capability and endurance limits.

Two other professional disciplines required to address HOF include: macro-ergonomics, and organizational system dynamics. Both are areas of ongoing research and development that facilitate the examination of shipboard work arrangements, from an organizational level (eg: interaction among crewmembers and supervisory hierarchy) to a more detailed perspective (eg: design of shipboard tasks). These disciplines are necessary to identify human, technological, and organizational coordination gaps degrading operational effectiveness and safety.

Examples of dysfunctional combinations may include improper equipment-human interface design, insufficient qualified personnel, and inappropriate processes to manage complicated shipboard operational activities. Without a close examination of shipboard HOF, including personnel, technology, and procedural elements, hidden operational hazards will

remain unrecognized.

One final, but important, discipline required to effectively address HOF resides in the analysis of operational systems and processes, usually referred to as 'systems analysis'. Systems analysis is vital for the evaluation of interactions and interdependencies among HOF and the unmasking of their combined impact on operational tasks, objectives, and goals. When HOF are addressed in isolation, and without the benefit of systems analysis, efforts to correct productivity and safety discrepancies may fall short because they fail to unmask the combined influence of multiple factors.

If the goal is to ensure safety in complex maritime work environments, then the disciplines discussed above are necessary to unmask and mitigate hidden operational hazards.

Otherwise, addressing HOF without understanding the interrelationships and interdependencies of shipboard evolutions, relevant technology, and work processes may actually lead to decisions that will increase the potential for unintended and unwanted consequences during normal operations.

www.uscg.mil/hq/cg5/cg5211/

Addressing human element issues a shipowners' association perspective

Arthur Bowring, Managing Director, Hong Kong Shipowners Association

It might not be immediately apparent, but not all shipowner associations are the same. Associations differ not only in the number of staff they have at their disposal, but also in the composition of their membership. This is important, because it is the membership that determines policy and direction. Members might be individual private owning companies, the shipping arms of large commodity or logistics companies, or publicly listed companies, all of whom would have very different objectives and needs.

I will describe what the Hong Kong Shipowners Association does and, from that standpoint, what I believe to be the skills required to address human element issues from the perspective of a shipowners association.

It is the mandate of the HKSOA to promote and protect its members' interests. This is a very wide brief, one that can incorporate almost any issue. On a recent count, I had 75 different issues on my desk, ranging from tax to toxic air emissions, from fatigue

of seafarers to failure of side shell frames. Our work on these issues can include the analysis of potential regulation, the development of best practice guidelines, and the identification of particular areas that are little recognized but potentially have a major impact on our members' businesses.

We are very active in almost every area relating to seafarers. We take a leading role in seafarer welfare issues and contribute widely to ILO and IMO debate. We are also heavily involved in seafarer recruitment and training, particularly of the Hong Kong cadets who will eventually be required by Hong Kong's shore-based maritime industry, as well as in the various courses required to up-grade the skills of those who work ashore.

Our members' interests are not, as some might believe, contrary to those of the seafarers, because our interests are almost always aligned. Seafarers are at the front line of our members' operations, and operate their high-cost assets. Their

conduct and professionalism determines the reception given by port state and flag state inspectors, as well as the satisfaction of the charterers of the ships. But perhaps our link to the seafarer goes deeper than that - during a small working group meeting in the ILO a few years ago, we found out that there were more ex-seafarers in the shipowners' group than in the seafarers' group.

In dealing with these issues, it is plain that some seafaring experience is essential. But perhaps the most important secondary attributes are: the ability for critical thinking and being able to identify from arduous legalese those issues that have probably been incorporated for the best of reasons but are not in anyone's interest; curiosity to investigate new things, and patience to explain complex issues to those with short attention spans; diplomacy, political and negotiating skills. But, importantly, a willingness to identify when something is amiss, and then a sufficiently thick skin to be able to stand tall and speak loudly to get the attention needed to put it right.

Looking at the role of the human element in the safety of marine operations

Park, Byong-Kon, Deputy Director, Maritime Safety Division, Ministry of Land, Transport and Maritime Affairs, Republic of Korea

In my opinion, 70% of all accidents are caused by the human element. But analysis and evaluation techniques on the human element are still not at a satisfactory level. At the same time, it is not an easy task to analyze or evaluate exactly how the human element has an effect on a marine casualty.

The Ministry is looking into how the human element/human factors play a role in marine accidents; we are researching the human element evaluation techniques arising from the accidents. So, we will first look at the broad range of the human element that may affect an accident and then we will evaluate it, look at the human reliability and will try to come up with a corresponding model to reduce those human factors.

One of the first things we assess is fatigue - how it affects ship operations. Based on these evaluations, we will look at the safety of marine operations so, right now, we are trying first to apply it at sea and then will try to relate it to marine operations ashore. If necessary, we will make a training programme for the seafarers.

There are various forms of working environments that we are looking at, including ships, shipbuilding, FPSOs and platforms, so if the research on the human element is successful we will

In my opinion, 70% of all accidents are caused by the human element. But analysis and evaluation techniques are still not at a satisfactory level.

try to apply it to training programmes, including training simulators, in the various maritime areas. We are also seriously thinking of setting up a training centre.

As long as this gives the answer to the basic questions of human element issues, we will expand our research. We started studying this last year

and our plan is to complete the study in approximately 5 years. But it is anticipated that the study would take considerable time because we do not have sufficient research resources to do it. However, the Government is very keen on, and is strongly supportive of, research and development projects in various areas including what we are doing here.

Personally, I think that job stability is closely related to the human element. Without job stability, we could not expect the prevention of human element related marine accidents. We are therefore undertaking a further study to identify necessary training for seafarers throughout their entire life and to provide pertinent training programmes for them. It means that we will provide the necessary training programme for seafarers from the time of becoming a seafarer, through each stage of his career until the finds a new job.

If this study is successful, we expect that human element related marine casualties will be controlled and we can hand down the expertise and knowledge of the older seafarer to the younger generation.

Grounding of a bulk carrier on a chartered shoal while approaching a loading facility

This report of the grounding of a 18,338 grt bulk carrier on a chartered shoal, whilst approaching a loading facility, highlights a number of human element issues relating to bridge resource management, the use of electronic chart systems, unfamiliarity with alarms and fatigue brought on by sleep deprivation possibly through the use of prescription smoking-cessation drugs.

The master was navigating the vessel from a westerly position to the approach channel, rather than using the previously-loaded Electronic Chart System (ECS) route plan, which called for a commonly-used southern approach. Although the OOW was aware of this deviation, the two did not collaborate on elaborating strategies to ensure the safety of this manoeuvre.

The master left the bridge momentarily and did not exchange information regarding the vessel's position with the bridge team, nor was this done upon his return. Moreover, because he was conning the vessel visually and could see the buoys leading to the channel entrance, he did not seek confirmation of the vessel's position in relation to the shoal. Nor did the OOW verify position via the ECS, radar,

or other means; instead, he assumed that the manoeuvre was in accordance with the master's normal practice

The benefits of the ECS were not fully realized, as the bridge team did not closely monitor the progression of the vessel. In addition, appropriate alarm settings used to safely monitor the vessel's progression were not available as none of the parameters had been entered into the ECS. Events recorded by the ECS electronic logbook were automatically acknowledged by the software. However, these events were not related to alarms for pre-set navigational parameters, as they require manual acknowledgements by the users - and no such acknowledgements were recorded in the electronic log book.

The bridge team was unfamiliar with the depth sounder alarm - which sounded for approximately 30 seconds shortly before the vessel grounded - and, as a result, took no action when it sounded.

The master reported both disturbed sleep and difficulty getting to sleep during the five days prior to the occurrence. He managed no more than five hours of sleep per day, including a maximum of 3.5 hours

of uninterrupted sleep at any one time. The report notes that this was a significant sleep debt that would likely have had a negative impact on his performance.

A prescription smoking-cessation drug that he was taking has known side effects, including sleep disturbance. The master was not fully aware of all potential side effects (including sleep disturbance) for a prescription smoking-cessation drug that he was taking. The report suggests that it is possible that the master's sleep-related symptoms were more pronounced as a result of quitting smoking and the drug.

The purpose of this summary is purely to highlight certain human element issues arising from this incident. Those who are involved in the management and operation of ships are strongly advised to read the whole report which can be downloaded from:

www.tsb.gc.ca/ENG/rapports-reports/marine/2008/m08c0024/m08c0024.pdf

In June 2008, the US Coast Guard issued Marine Safety Alert 2-08 notifying merchant mariners navigating in US waters of the potential side effects of the smoking-cessation drug Chantix (varenicline) - downloadable from: www.uscg.mil/NMC/Whats_new_to_NMC/Marine%20Safety%20Alert%202-08.pdf

Reports & Studies

The 8 safety links: Tools to boost the company's safety culture

Seahealth Denmark

A range of tools for developing and strengthening shipowners' safety culture

Downloadable from: www.he-alert.org/documents/published/he00875.pdf

Inspectors Toolkit: Human factors in the management of major accident hazards

Health & Safety Executive (UK)

Developed for use by HSE inspectors, to support the consideration of human factors in site inspections, accident investigations and assessment of company documentation

Downloadable from: www.hse.gov.uk/humanfactors/topics/toolkit.pdf

Human Element?

Bob Thomson
Australian Maritime Safety Agency

Bob Thomson asks the question: What are the human factors that are being held to account for marine accidents?

Downloadable from: www.he-alert.org/documents/published/he00880.pdf

Collision scenario-based cognitive performance assessment for marine officers

H Kim & H-J Kim

Marine Transportation & Pollution Response Research Dept, MOERI/KORDI, Daejeon, Korea
S Hong, Chungju National University, Korea

The overall aim of this paper is to determine a fatigue factor that can be applied to human performance data as a part of a software program that calculates total cognitive performance

Downloadable from: www.he-alert.org/documents/published/he00885.pdf

Alert!

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