

The International Maritime Human Element Bulletin

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Alert!



Responsibilities come before skills. Each of the **Alert!** bulletins in this series is about defining the responsibilities of a particular stakeholder group with respect to addressing the Human Element. From these we intend to develop descriptions of the knowledge and skills necessary to discharge those responsibilities.

But, we would not be 'user-centred' if we did this on our own. Contributions from those who have already benefited from the right training and experience will be essential to ensure that we get it right. What we offer in the centrespreads will serve as a 'first draft', which we will ultimately develop through the **Alert!** website, with a view to providing a comprehensive human element skills framework for all the various stakeholders by the end of this series of bulletins. Feedback, therefore, is essential - and very welcome.

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.

The Editor

Alert!

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The ultimate aim...

In an age of swift invention it is frequently believed

That the pressure of a button is as good as work achieved;

But the optimist inventor should remember, if he can,

Though the instrument be perfect, there are limits to the man

(Ronald A Hopwood, 1913
from the poem **Our Fathers**)

Fundamental to the safe and efficient operation of any ship or its systems, and to the health safety and wellbeing of the crew, is good design - always keeping the human element in mind.

Naval architects and system designers need to keep in touch with those who work and live aboard ships; they need to have an appreciation of 'the ways of the sea' and of 'the ways of the seafarer'. They need to understand that today's ships operate with crews, both male and female, of different nationalities and cultures and of different shapes and sizes, such that what may be a good design for one group may not necessarily be so good for another.

They need to be able to identify and describe the physical and social context in which their system, product, service or facility is going to be used,

taking full account of the nature of the work being done, the implications of their design for the users and how this context will evolve during the life of the ship. They need to understand the principles of human-centred design (HCD) - see **Alert!** Issue No 7 - and Human Systems Integration (HSI) to ensure the full integration of the human with other elements into every system.

But, the shipowner/operator also has a role to play here, not just in setting out the context of use, but also in providing a robust specification of requirements, having already consulted with the crews through an established and open feedback process, to determine the lessons learned from previous designs and current operations, including crew working and living conditions.

When considering the design, or updating of ships and their systems, it is important that all stakeholders keep in mind the key human factors considerations of: habitability, maintainability, workability, controllability, manoeuvrability, survivability, usability, reliability and supportability and acceptability.

The ultimate aim is to make ships, systems and equipment more effective, efficient, safe and acceptable in use, in other words usable by, seafarers.



Human element shipyard training

Andrew Sillitoe, Human element specialist, Lloyd's Register

Lloyd's Register periodically runs a two-week training course for senior employees of Korean and Chinese shipyards. This covers a variety of topics including changes to regulations, technologies, and particular industry sectors.

For the last few years, we have included the human element. We introduced this for two reasons: Firstly, to explain why it is relevant to the work of those who design and build ships. Secondly, to explain what it encompasses and how aspects of it can be addressed through design and build. This supports our efforts to improve the treatment of the human element within classification, in both core Rules and additional notations.

Discussions during the training courses have brought us many learning points. These are shared here, to facilitate wider application of human factors by those who can influence a new ship in the earliest stages of its lifecycle.

The training session describes the human element with a systems view. We have found that this helps to demonstrate its

relevance to shipyards, as it is sometimes perceived as purely an operational matter for the ship after entering service. This can be refuted by demonstrating that well designed and outfitted workplaces and habitable living spaces are as integral to safe and effective ships as are good training, procedures and policies.

Another misconception is that the human element is a 'soft' subject; an intangible topic which bears no relation to naval architecture or engineering. This can be countered in two ways: One is to introduce the scientific and goal-driven techniques which can be applied. We explain these within the human factors integration process, including analysis of a ship's context of use and application of appropriate anthropometric data. Another is to make the case that those who commission and buy ships from the yards are increasingly likely to seek assurance of human factors being properly applied during the design and build process. The realisation is growing that ignoring or failing to address human factors early on will store up problems, and costs, for later in the ship's lifecycle.

Remembering to 'design for the user' is a simple message, but when communicated clearly and embraced in spirit it can support a culture shift. At a basic level it encourages analysis of, for example, the bunk sizes needed for crews of Scandinavian versus Filipino seafarers, or the heating and ventilation systems needed for ships which will sail in tropical versus cold climate regions. At a more complex level it encourages an iterative design process for the vessel and its onboard systems and areas. User requirements and tasks will be fully defined and understood, ergonomic principles applied, and proposed solutions tested.

More thoughtfully designed ships benefit seafarers through improved health, safety and comfort. They also bring commercial and operational benefits to ship owners and operators. Shipyards which best understand this and are best prepared to meet this purchasing demand will be able to lead rather than follow the changes.

For further information about the Lloyd's Register human element training, go to: www.lr.org/sectors/marine/Services/training/

Consideration of the human element on ship design

Yinghua Guan, Deputy Chief Designer Dalian Shipbuilding Industry Co. Ltd

The Chinese Shipbuilding Industry is currently developing very quickly, and Dalian Shipbuilding Industry Co. Ltd (DSIC) is one of the biggest, busiest and best known shipyards in China.

Prior to placing an order for a newbuilding in a shipyard, owners do not only consider price and quality, but will also pay attention to good design. Good design does not only mean economical design and satisfying the regulatory requirements, but should also be considered in terms of making the ship as effective as possible. This is where we must consider 'The Human Element' in our ship design.

With the fast growth of shipbuilding in China and increasing demands from owners, the human element is already a major focus for Chinese shipyards, in pursuit of safer and more effective ships.

We are seeking to improve non-compulsory aspects of design, in particular:

Reducing ship vibration and noise

Vibration and noise analysis is conducted during the early stages of design, and pillars and stiffeners added and plate thicknesses increased as necessary to minimize vibration, especially in accommodation

areas. Additionally we incorporate a special noise reduction design in working areas.

Improving the working and living environment

Onboard ship, the crew are working and living in a very limited space. This space is regarded as 'home' to them. In order to make their work and life more convenient and comfortable, we are investigating the application of the requirements of the Maritime Labour Convention 2006 (MLC 2006). We have designed comfortable accommodation in accordance with it, although it is not compulsory. The relevant spaces include bridges, machinery control rooms, galleys, messrooms and recreational spaces.

Additionally, thoughtful consideration was given to providing the crews with enhanced operability, such as special sliding chairs for navigators on the bridge. Control switches and buttons are always arranged so that they are easy to approach and operate on consoles etc.

Ease of operation and maintenance

One aspect of human element design which is constantly in our designers' minds

is to ensure that access/removal routes are optimized to retain sufficient space for operation and maintenance.

Complete final documentation

Sufficient information shall be provided onboard at ship delivery for crew guidance, for example: equipment and material specifications and procedures. Previously this final documentation has not always been in accordance with the owner's requirements. The absence of drawings for small components or procedures may not clearly guide the crew's operations etc. We are working hard to improve this. As-built drawings are as accurate as possible, and vendor drawings are checked carefully to ensure the content is complete and exact. Furthermore we made procedures together with class, such as a supplementary training program for VECs (Vapor Emission Control System) manuals and preparing a VOC (Volatile Organic Compound) manual to guide the crew's work.

The human element is a critical feature of all aspects of ship design and operation. The major Chinese shipyards have recognized this and are trying their utmost to improve their designs, providing the owner with better and more comfortable ships.

Adopting a Human Systems Integration approach to design

Bonnie Novak, BMT Designers & Planners, Inc

Human Systems Integration (HSI) is the systems engineering discipline directed at addressing human performance in technology development and system acquisition. This includes designing for human capability, proficiency, human utilization, accommodation, survivability, health and personnel safety, in the acquisition strategy.

From an HSI perspective, the major concern is to maximize human performance and minimize human performance risks, which address established deficiencies in any one or more of the constituents of human performance including (a) human capability (inability to perform as required), (b) human proficiency (training is inadequate), (c) human availability (systems are understaffed or crew is overworked), (d) human utilization (personnel are assigned to work who are lacking the required knowledge and skills), (e) human accommodation (quality of life in the system or platform is inadequate), (f) human health and safety (hazardous design features, working environments, or work practices are encountered), and human survivability (protection is inadequate for systems personnel and/or bystanders).

HSI ensures the full integration of the human with other elements of the system, including hardware, software, courseware, information, procedures, policy and doctrine, documentation, design features,

technology, environments, organizations, and other humans.

The specific domains of HSI vary across the U.S. Department of Defense and U.S. Department of Homeland Security but they all primarily include the following aspects:

Manpower - quantity and quality of personnel required;

Personnel - requirements for recruiting, retaining, assigning, and supporting personnel in career advancement;

Training - requirements and techniques for delivering needed knowledge, skills and abilities to the human;

Human factors engineering - requirements, concepts and criteria for design of user interfaces in accordance with the capabilities and limitations of the human;

Habitability - requirements for providing an adequate quality of life;

Personnel survivability - requirements for human protection and safeguards; and

Safety and health - requirements to reduce hazards to human safety and health.

HSI considers the human to be an essential element of the system. Proper application of HSI ensures successful and affordable total system performance as a direct

function of the design of system user interfaces to effectively meet customer and user requirements and needs. The extent to which HSI can influence design is reflected not only in how early in the systems engineering process it is addressed but also to what degree program management has accepted the involvement of HSI in the acquisition of the system. HSI in system acquisition is directed at identifying, prioritizing, and mitigating risks to human performance, workload, safety and occupational health, and well being.

As a systems engineering discipline, HSI must be addressed both in system requirements documents and life cycle documents and in all acquisition documents that address the roles, requirements, and constraints to be placed on the human element of the system. Recognizing these best practices and applying them to system design will provide best value engineering and technical products as well as ensure technologies, new and existing, are designed with the most effective, efficient, and affordable workforce management support, job performance preparation, human performance reliability, and a habitable and safe work environment.

A comprehensive paper titled U.S. Department of Homeland Security Human Systems Integration Applied to U.S. Coast Guard Surface Asset Acquisitions – on which this article is based - can be downloaded from: www.he-alert.org/documents/published/he00925.pdf



To share or not to share: The hidden challenges of knowledge sharing

Doron Zilbershtein, Co-chair Maritime Quality Culture Forum, the Society of Naval Architects and Marine Engineers (SNAMe)

The proliferation of the Internet has moved the world from the *Information Age* to the *Knowledge Era*. What is *Knowledge*? My favorite definition is: *The translation, view and application of a given information through the lenses of personality, character attitude and life experience*. It may not be fully inclusive but is sufficient to express the difference between information and knowledge.

Knowledge must be relevant, properly defined, and should meet a specific threshold. It must be easily searchable, accessible, credible and trustworthy. It must be usable and available in a timely manner - imagine finding a report but waiting two weeks to receive a copy

from the library, or receiving a drawing from overseas only to discover that it is of poor quality.

Knowledge is subject to human interpretation. In the translation of information into knowledge it may be skewed due to an inherent bias. Since knowledge is power, the willingness to share it is important. When interviewing candidates for a position in an engineering firm, pay attention to signs of egos, antisocial personalities and unfriendly attitudes. Ask if they share their unique knowledge with their peers and WHY? Lack of knowledge sharing in businesses becomes an obstacle and reduces your organization's ability to create and innovate. It may also impair your ability to deliver a rewarding value to your clients.

Knowledge is also a function of professional exposure. The more experience one

has the more detailed and accurate is the shared knowledge. Therefore we need to ensure that the younger inexperienced engineers are mentored adequately. They need coaching to enhance their critical thinking through a problem solving process. They equally may need assistance in polishing their technical writing skills.

Personality also affects knowledge sharing. Introverted people are less descriptive in conveying a message. Extroverted individuals, on the other hand, may inflate the facts beyond recognition by introducing their personal bias to the knowledge.

Overcoming the threshold of knowledge sharing in an individualistic society doesn't come naturally. It is important to create a culture that encourages and rewards people for sharing their knowledge and experience with their peers.



Naval Architects & Designers

- Recognise that the operational safety and business effectiveness of ships are dependent on a number of elements all working together in an integrated way
- Fully understand the importance of the human element to assure good design and construction as well as operational aspects
- Ensure that the introduction of technology and reductions in manning take account of responsibility and human competence, capabilities and limitations (e.g. fatigue and stress) or available procedures and resources
- Fully understand that an ergonomics approach to design must be human-centred
- Fully understand that design must take full account of the nature of the task and its implications for the human
- Be aware that the environment in which a system, product, service or facility is intended to be used has to be identified and described
- Be mindful that ergonomics must be considered early and continuously within the design process
- Be mindful that sufficient attention should be given to the application of ergonomics principles in order to prevent any negative effects
- Be mindful that ergonomics criteria must be established for the design
- Be mindful that conceptual and detailed designs shall take account of ergonomics criteria
- Be mindful that the users (or potential

users) must be involved in the process of design

- Distribute functions between the human, machine and organisational elements of the system best able to fulfil each function
- Develop a practical model of the user's work from the requirements, context of use, allocation of function and design constraints for the system
- Produce a description of how the system will be used
- Produce designs for the user-related elements of the system that take account of the user requirements, context of use and human element data
- Be aware that evaluation of the ergonomic design of any system, product or service must be based on established ergonomic criteria
- Revise design and safety features using feedback from evaluations

Note: The type of user involvement will differ for different roles. For equipment and systems design the understanding and usability of complex and novel functions will be a major issue and this will require fairly direct user input. For naval architects the issues will probably be related to ergonomics, health and safety, interior design and other aspects that have been standardised and there may even be regulation. However, wherever there is uncertainty users will have to be involved in some way

Project Managers

- Understand that human-centred design should be planned and integrated into all phases of the product life cycle
- Understand that any plan for human-centred design should form part of the overall project plan
- Be mindful of the need to adopt process modelling and assessment as an element in the assurance of timely and effective system delivery
- Be mindful that the design process is iterative
- Be aware that the design team should include multi-disciplinary skills and perspectives
- Be mindful that project planning should allocate time and resources for the human-centred activities
- Ensure that users are involved throughout the lifecycle such that the design is driven and refined by user-centred evaluation
- Fully understand and specify the context of use such that design is based upon an explicit understanding of users, tasks and environments
- Fully understand the need to identify user needs and specify the user requirements



Shipowner/Operator

- Ensure that the design addresses the whole user experience
- Ensure that design solutions include ergonomics and user requirements
- Be mindful of the need to consider the relative importance of ergonomics in the project
- Be mindful of the need to identify and describe the environment in which a system, product, service or facility is intended to be used, taking full account of the nature of the task and its implications for the seafarer
- Be mindful of the need to design for the target population and the whole user experience
- Be mindful of the need to drive and refine the design by user-centred evaluation and use of established ergonomic criteria
- Include multi-disciplinary skills and perspectives in the design team

Note: The senior management of manufacturers and shipyard have a responsibility to analyse and understand the value of quality in use of their products and to champion HCD

- Include and integrate human-centred design into the overall project plan and all phases of the product life cycle
- Integrate milestones for human-centred activities into the overall design and development process
- Allocate time for iteration and the incorporation of user feedback, and for evaluating whether the design solution satisfies the user requirements
- Identify the range of skills and viewpoints required
- Involve workers or users (or potential workers or users) in the process
- Identify and use the most suitable formats for exchanging human element data
- Include human resources and human-centred design in corporate procedures, standards and guides
- Define and maintain human element processes, methods, tools, techniques and test facilities
- Perform research into required ship and system usability for future operating concept
- Define usability as a competitive asset
- Set usability objectives for ship operation
- Develop user-centred infrastructure
- Perform early analysis of the future operating concept
- Identify expected context of use for possible future operating concepts
- Relate human element issues to business benefits
- Identify human element issues and aspects of ship operation and design that require crew input
- Take account of crew input and inform crews of changes made
- Select and use the most effective method to obtain crew input
- Plan user involvement
- Assess the risks of not involving crewmembers in each evaluation
- Take account of human element issues in acquisition
- Include human element review and sign-off in all reviews and decisions
- Take effective actions to address human element risks
- Assess the extent to which human element considerations are likely to be met by proposed operations
- Review the design and operation of the ship for adherence to regulations and industry guidelines
- Analyse feedback on the operation of the ship and inform the company of emerging issues
- Maintain contact with all involved staff throughout the introduction of the ship or new operation
- Test that the ship and its systems will meet the needs of the crew, the operation and the environment
- Build the required competencies into training and awareness programmes
- Identify, specify and deliver the training and support for the operation of the ship

Note: Responsibility for usability rests with the owner/operator. However, naval architects, designers and project managers need to address many of these topics so that they have the capability to respond to owner/operator requests

Human Factors in Ship Design: A question of skills – and something more...?

Margareta Lützhöft, Chalmers Technical University, Gothenburg, Sweden, Erik Styhr Petersen, Lyngsø Marine A/S, Hørsholm, Denmark

Ergonomics, human factors, user friendliness and usability are terms that are frequently used in the maritime sphere, and it may – for the purpose of this piece – be useful to discriminate: Human factors and ergonomics are two different names for the same discipline, which is the science concerned with the understanding of interaction between humans and other elements of a system. Usability is defined as the effectiveness, efficiency and satisfaction a user experiences during the usage of a system, and is the current concept in this respect. As such, usability replaces the former term of user friendliness, also adding and highlighting that usability is a combination of the subjective and the objective. In this light, it may be useful to think about human factors as the knowledge base, and good usability as the goal of any design effort.

Usability has both anthropometric and cognitive aspects – a system with poorly designed interaction devices, for instance, may be as ineffective as one with missing functionality – and good usability requires a conscious effort. User Centred Design, as described in ISO 9241-210 (2009) is the primary and universally accepted design-for-usability method.

When it comes to the ship's bridge, and bridge systems, SOLAS Ch. V/Reg. 15 and a number of international standards provide an important foundation for the design process: ISO 8468 (2007) relates to the anthropometric and layout aspects of the bridge, while IEC 61174 (2008a), IEC 62288 (2008b) and IEC 62388 (2007) relate to

the required functionality of the primary instruments, RADAR and ECDIS, and the uniformity of information presentation.

In our view and experience, however, conformance with these standards is insufficient to achieve good usability. Simply adding up a number of individually conforming parts in a somewhat standardized arrangement does not provide an effective, efficient or satisfactory work system by itself. To achieve that, comprehensive knowledge about the tasks and routines of bridge team work must be brought into play; and, recognizing that bridge equipment often is supplied by a number of different vendors, inconsistencies or systemic shortcomings must be addressed and mitigated. Even considering rather simple issues like the orientation of controls to match the spatial arrangement of the bridge and the ship, including ship operations, bring substantial benefits with them, but requires particular knowledge.

While mastering hydrostatics, hydrodynamics, propulsion and structural design, which indeed are the core disciplines of naval architecture, and which are the skills in general demand within this area, naval architectural practice is also capable of participating in, or indeed leading, the design of ship's bridges and other control rooms, and will usually define the general arrangement pertaining to these places. Recognizing, however, that human factors is a science, subject to the lifelong study for some, just like engineering and naval architecture

is for others, the traditional design skills possessed by naval architectural practice will, entirely reasonably but also unavoidably, fall short of the need when it comes to the kind of usability engineering control room design entails - especially considering the numerous specialized facets and details that must be catered for in an effective, efficient and satisfactory workspace.

Hence, we suggest that the primary understanding naval architectural practice requires, apart from the knowledge and skills relating to the key subjects of this discipline, is the insight to realize that outside support is not only needed, but also carries the potential to provide significant benefits, for undertakings where usability is the primary goal. In practical terms, such a team should include, in addition to the ship designers and naval architects, a representative spread of end users, key suppliers, human factors specialists and industrial designers and/or interaction experts.

The fact that participating or even leading a multidisciplinary design team furthermore requires championing, patience, determination and stamina - which appear to lead to widespread organizational change - is another story.

A fully referenced version of this article can be downloaded from:

www.he-alert.org/documents/published/he00930.pdf

To access the first and only dedicated resource to assess human factors at sea go to: <http://www.mtosea.com/>

Developing the e-navigation concept – a human initiative

Jon Erik Hagen, Regional Director, Norwegian Coastal Administration Chairman IMO e-navigation Correspondence Group

Many people say to me that e-navigation is about technical stuff, but I say 'no' – it is about human beings. E-navigation is a concept to support humans with the management of information to improve good decision making. When we look at the challenges in our industry it is important to recognise the opportunities that advances in technology offer; however, after further inspection it is clear that the major challenge to embrace is the human element.

Both within and outside the maritime industry there is a greater demand than ever before in the history of shipping: bigger ships, faster speeds, greater port efficiency, more regulations and, above all, far higher demands for public accountability. Therefore, I urge all to recognise the fact that that e-navigation is a human initiative, and to get the best

effect from the development of e-navigation it must be strategically addressed by national maritime administrations.

The basis of our work is to identify the user needs; we need to identify user needs onboard, ashore, on communications and on search and rescue. Having identified the user needs we can then define the functions, describe system architecture and conduct a gap analysis, and then we will continue with a cost benefit analysis.

This is a large project in the IMO context, with more than 50 member states and international organisations participating in the correspondence group, and involving more than 150 people. While most of these represent maritime administrations we also have the involvement of international organisations such as IALA and the Nautical Institute both of which contribute a lot. The Nautical

Institute is very important for us because they represent the input from seafarers. We know that according to reports from the Nautical Institute, 60% of collisions and groundings are related to human error and so a very important objective for us in the programme of e-navigation is to try to reduce these human failures.

Training of course is important because we are focusing on the human being and that means that there should be an acceptable global competence level. That is not easy, but it is our mission to achieve this. My task is to chair a programme which will, at the end of 2012, be presented as an implementation plan for e-navigation - so we are developing the concept and creating the implementation plan to be presented to the IMO Maritime Safety Committee (MSC) in 2012.

For further information on e-navigation issues go to: <http://e-nav.no>

Factoring in the human element in the design of ships

Captain Peter Holloway, Managing Director, London Offshore Consultants Ltd



In factoring in the human element in the design of ships, a designer must understand how those responsible for managing the cargo systems and operating the vessel at sea go about their business, in what conditions and over what period of time. The human element is known to cause in excess of 80% of ship casualties and this often is a result of complacency and reliance on electronic systems. Injuries to personnel are often caused by awkwardly placed, poorly designed and difficult to maintain equipment where the ergonomics of the as-built layout failed to consider how the equipment might be operated.

Once there is an understanding of cargo handling, then the designer will incorporate features into the system that ensures safe operation on a repeated basis such as to provide a working environment that prevents injury to the operator and those around him. Simplicity of operation and ease of maintenance is the key: if it is not easy to operate, the human element may introduce unsafe shortcuts where an unapproved modification might be made, and, if maintenance is difficult because of access for example, and it may not be carried out, then equipment may fail from fatigue or lack of lubrication, sometimes with fatal consequences.

The operation of the vessel at sea needs sufficient equipment to permit the safe conduct of the vessel from port to port, and for it to be simple to operate. A vessel operates in all weathers and in all marine

environments, such as entering or leaving port, navigating in confined waters and in the open sea, sometimes in very limited visibility and sometimes in a very dynamic working environment.

Navigational equipment must provide sufficient information that is simple to understand and assimilate so that the watch officer can make appropriate decisions that keep the vessel out of danger and on course without struggling to interpret different formats and systems. In order to achieve this, a designer should listen to watch officers, or spend time in the wheelhouse of a ship to understand the needs of a deck officer in the wheelhouse who is required to navigate the vessel, and avoid collision with others, and remain alert for the long hours of his duty period.

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A system should be designed to be easy to operate and maintain

Mike McLachlan, Associate Marine Engineer, London Offshore Consultants Ltd



I believe that to address the human element and human factor issues during the design, build and maintenance of a vessel and its systems it is important for the designers to have an understanding of ergonomics and the ability to visualize the completed system or layout and its operability. The ergonomics related to the operation and maintainability of machinery and systems are an essential factor when addressing the human element. A system should be designed to be easy to operate and maintain.

Additionally, it is important to have an understanding of the maintenance requirements and philosophy to ensure the design meets these constraints. If maintenance is difficult to achieve due to access problems, or dismantling large parts of the system is necessary, then at best it will take far too long to achieve, and at worst be neglected as it is too difficult, leading to premature failure.

With the use of CAD (Computer-aided design) it should be possible to overlay each system to ensure it fits, and create 3D images to trial the complete ergonomics of all systems prior to final design. Systems that are badly designed can be difficult to understand, and system tracing to identify components in the machinery space nigh on impossible.

It is important to understand the consequences of increasing the automation and advanced technology on a vessel's design, which appears to be having the effect of an ever increasing reliance on shore based support, with the Chief Engineer almost becoming a caretaker for the machinery and relying on shore based technicians and engineers to conduct diagnostics and repair. Whilst this may be an advantage for the owner or operator of the vessel as he can decrease crew numbers, it has the effect of demotivating and downward skilling the seagoing Engineer, with the consequent retention problems and lowering of onboard standards.

Whilst the drive to decrease costs is recognized the design must not become so complex that the crew are unable to undertake repairs or operate any reversionary modes to keep the vessel safe and get back to port in the event of malfunction.

Human element vodcasts

Another initiative to raise awareness of human element issues to an estimated 500,000 international students involved in every sector of the shipping industry, from cadets to those in the commercial or regulatory sectors, has been launched by The Nautical Institute, sponsored by The Lloyd's Register Educational Trust.

The Institute has created a series of 'vodcasts' (video podcasts/shareable video clips) for students and lecturers to use to share knowledge of some of the key human element issues that affect shipping including fatigue, communication, health and safety.

Featuring real shipboard environments that demonstrate best practice, each of the 21 core subjects featured in the **Alert!** Human Element Bulletins will be addressed in a series of three-minute, high quality educational vodcasts, which will be available free from the **Alert!** website.

They can be viewed online or downloaded to a computer or a portable device such as a mobile phone or iPod. This will enhance effective viewing and sharing by students around the world. Lecturers from all sectors of the shipping industry will also benefit from importing the vodcasts into their PowerPoint presentations for improved teaching impact.

The first 7 vodcasts are now available for downloading from: www.he-alert.org.

Fatality on board a container ship

This report of the investigation of a fatality to a seaman aboard a 16-years old 14,858 grt geared cellular container ship, whilst trying to stow the cargo crane hook in its cradle, reveals a number of human element safety issues. But, a significant contributing safety factor was that the design of the cradle for the cargo crane hook did not allow for unassisted stowage of the hook when the ship had a stern trim in excess of 2.1 metres.

The cradle's opening allowed the hook to be stowed without intervention only when the ship had a stern trim of 2.1 metres or less. The cradle could not be seen from the crane driver's cabin when containers were stowed two or more high on the hatch cover. Hence, it became usual for a crew member (known as a 'dogman') to give directions to the crane driver, via a hand-held radio, to lower the hook until it was stowed.

On this occasion, the stern trim was 2.5 metres, such that the hook did not align with its cradle. The rating had climbed about 4.1 metres up the emergency ladder

on the crane pedestal in an attempt to manually guide the hook into position. It is likely that while trying to position the hook, he fell, landing on the platform below.

The reason the rating fell could not be determined exactly. However, he was not wearing a safety harness, as was required for carrying out tasks at a height of 4 metres, on a ladder that was not fitted with safety devices to reduce the risk of a fall.

It had become the normal on board routine for the dogman to climb the emergency ladder and 'manhandle' the hook into a position where the crane driver could, on direction, lower the hook into the cradle. Climbing the ladder was a relatively easy solution to the problem as there was an area on the cradle bracket on which the dogman could place his foot. With one arm holding onto the ladder, and a foot on the bracket, the hook could be aligned manually.

The Job Safety Analysis for crane operations, and subsequent reviews of

it, did not identify the potential hazards associated with stowing the hooks; no issue regarding hook stowage problems at stern trims in excess of 2.1 metres had been raised at Health, Safety and Security Environment (HSSE) meetings, nor had anything been entered in the job hazard opportunity log.

No working aloft permit had been issued for the practice of climbing the emergency ladder when stowing the hook on that day; and, no permit had ever been issued for this task. This indicates that the crew had routinely deviated from the working aloft procedure when it was necessary to manually assist with the stowing of the cargo crane hook and that the working aloft procedure was not effectively implemented on board the ship.

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.atsb.gov.au/media/805349/mo2008011.pdf

Reports & Studies

Shipping KPI Project - Past, present and future

Norwegian Research Council in partnership with MARINTEK and Intermanager

The Shipping KPI proposes a global shipping industry standard for defining, measuring and reporting information on operational performance in order to boost performance improvements internally in companies engaged in the ship operation activities; and to provide an efficient communication platform of ship operation performance to internal and external stakeholders.

Downloadable from: www.he-alert.org/documents/published/he00935.pdf

Letter to the Editor

Veeresh Malik, New Delhi

A response to Richard Sadler's column in **Alert!** Issue No. 23, May 2010

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Best practice for addressing human element issues in the shipping industry

J Earthy & B Sherwood Jones

The paper analyses the latest 'capstone' standards for Ergonomics and HCD (Human Centred Design) in the context of ship systems and draws conclusions for design and its interface to design offices, shipyards and other stakeholders.

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Allowing time for safer and better operations

Captain Shahrokh Khodayari

When there are statistics given for accidents and causes as well as near miss cases, there is hardly any talk about time allowed for such operations which having been done incorrectly or erroneously, led to those accidents. This essay tries to look at the time allowed and see that how time in relation to Human Element issues can play a vital role in daily routine operations as well as in emergencies.

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