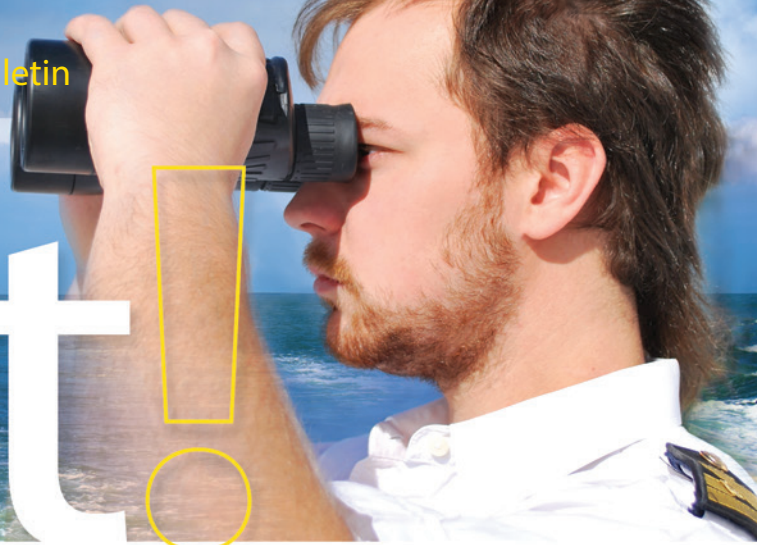


Alert!



Alert! - a strong international brand

Professor Richard Clegg,
Managing Director,
Lloyd's Register Foundation



Final Issue but ever Alert!

Philip Wake, Chief Executive,
The Nautical Institute

Over twelve years ago, Julian Parker, the Secretary of The Nautical Institute, and Vaughan Pomeroy, Manager, Research and Development, Lloyd's Register, began to develop an idea for a publication devoted to raising awareness of human element issues.

Evidence from The Nautical Institute's confidential marine reporting scheme, MARS, was indicating that there was a need for a defined, authoritative body of knowledge, across a diverse, global and changing maritime industry, to help improve safety by encouraging ship designers, builders, managers and operators to adopt relevant human element principles. Lloyd's Register acknowledged that awareness of the human element needed to be improved amongst those making the day-to-day decisions that affect ship design and operation.

In 2003, The Nautical Institute put a bid for funding to the embryonic Lloyd's Register Educational Trust, resulting in twelve issues of **Alert!** and the related website, which was launched in October 2003

By 2006, when an application was submitted for a second series of a further nine issues, the vision and leadership of its initiators was clear. **Alert!** had become a strong international brand and vital safety resource to the maritime industry, winning praise from professionals, including the prestigious *Seatrade* awards in 2004. Issues 13-21 built on awareness raised by focussing on tools, procedures and techniques for applying human element principles.

Now, four series later, Lloyd's Register Foundation is delighted to recognise this achievement with publication of Issue No. 40. We can celebrate an extensive readership: 4,000 copies of each issue are read electronically, together with 55,000 print copies reaching international maritime training and professional organisations worldwide.

The legacy of **Alert!** is much more than the bulletin. We are grateful to The Nautical Institute for continuing to manage the website, where thousands have already accessed all of the bulletins, and additional content including instructive videos and a library of papers, articles and illustrations, so that this significant resource remains available.

An international network of interdisciplinary industry leaders continues to share ideas. Ultimately, the impact of this partnership is to improve conditions for seafarers and safety at sea. Lloyd's Register Foundation is rightly proud of its long association with **Alert!** from its very beginnings.

It is appropriate and my pleasure to start by recognising the originators of the Institute's Human Element Project, Julian Parker and Vaughan Pomeroy, and the crucial funding provided by the Lloyd's Register Foundation over the past 12 years. The Institute has always sought to raise awareness of issues affecting the industry, often before they are in the collective consciousness, and to be supported by a like-minded organisation with the stature of Lloyd's Register in this project was the key in also providing solutions to the issues identified.

We are most grateful to the contributors to the project over the years and to our dedicated Editor. In page 6 of this Issue, Thimio Mitropoulos rightly questions why the **Alert!** bulletin is ending now when there is so much still to do to embed the application of Human Element principles in all the industry does and strive for further improvements in safe and efficient operations. The answer is that this final Bulletin is by no means the end of the Human Element Project, just the end of the beginning.

The body of knowledge compiled will be maintained and can be added to in the website, www.he-alert.org, which The Nautical Institute will maintain and we will continue to use this material in all our work going forward. In this respect, we are particularly grateful to Harriet Myles at the University of Southampton for compiling the **Alert!** Index in such a user friendly style, and for her pertinent paper *Human Element in Ship Design* to help educate many in the industry (see Page 8 of this Issue).

It is now up to all of us to ensure that the Human Element remains the focus of attention in ship design and operation for the current and future generations of practitioners. The legacy of the **Alert!** material in hardcopy and website libraries, including videos, is there to be used. We are confident that it will influence and help the next generation as it is already doing so in our recent book *Human Performance and Limitation for Mariners* and *The Navigator* series.

Human Performance and Limitation for Mariners,
a Nautical Institute publication, ISBN: 978 1 906915 34 6,
www.nautinst.org/pubs

The Navigator series, downloadable from:
www.nautinst.org/en/Publications/the-navigator/

Introduction

David Squire, FNI FCMI



The Editor
Alert!
The Nautical Institute
202 Lambeth Road
London SE1 7LQ
United Kingdom
editor@he-alert.org

When the **Alert!** project was launched in October 2003, little did I realise that it would run for 12 years, and produce 40 **Alert!** bulletins, comprising of some 350 articles from a variety of stakeholders across the maritime industry, plus 21 instructional videos, 40 informative centrespread features and about 250 papers and presentations in our website library.

Only time will tell whether the project has truly influenced the way in which the various industry stakeholders deal with human element issues, and whether there has been a reduction in the number of accidents resulting from human error; but, there is no doubt that today there is a greater awareness of this important subject.

I am very grateful to The Nautical Institute for giving me the opportunity to be the editor of **Alert!** and to Lloyd's Register Foundation for funding the project. I am indebted to David Patraiko at The Nautical Institute, and to Dr Jonathan Earthy at Lloyd's Register for their support and guidance over the last 12 years. And I particularly want to thank all those who have given of their time, and of their professional experience, to write articles for the bulletins.

It is not easy to summarise the content of the last 39 Issues of **Alert!**, but there is one final message:

Know thy users - for they are not you! A well-designed ship and its systems should meet the needs of the operator, be easy to use, easy to maintain and, above all, reliable.

Look after your people - and they will look after you. The health, wellbeing and welfare of the seafarer is crucial to the safety of any ship.

Competent people make the difference. Competent, experienced and well-trained people make the ship safe.

Wake up to the consequences of fatigue. Fatigue management should be high on the agenda for all ship designers, managers and seafarers.

Effective communication is the key to successful operations. The ability to properly convey information by word of mouth and/or by written communication is important not only to the safety of the ship's crew, visitors and passengers but also to the wellbeing of the crew.

And finally: **Safe, happy, healthy, well-trained and motivated seafarers will prove an asset to any company.**

Reports & Studies

Human factor competencies for the future mariner

Captain Pradeep Chawla
Managing Director, QHSE & Training Anglo-Eastern Ship Management Ltd

Captain Chawla discusses the changes that are taking place in the maritime industry and their effects on the daily life of the seafarers. He further discusses the human factor competencies that will be essential for the future mariner.

Downloadable from:
www.he-alert.org/docs/published/he01345

A human element competence framework

The **Alert!** project

Through the **Alert!** project, we have developed a series of human element competence templates for those who are responsible for: procuring, financing, specifying, designing and overseeing the build of a ship and its systems; operational, technical and people management; maritime education and training, HSSEQ management; and the development of maritime conventions, regulations and technical standards.

Downloadable from:
www.he-alert.org/docs/published/he01350

Join us on the following sites



<http://www.linkedin.com/groups/Nautical-Institute-1107227>



<https://facebook.com/thenauticalinstitute>



<https://twitter.com/NauticalInst>



<http://www.youtube.com/TheNauticalInstitute>



A reservoir rich in nourishment

Julian Parker OBE FNI, Former Secretary, The Nautical Institute
Patron, **Alert!** project

It was chance that brought together Vaughan Pomeroy and myself on a flight back from a seminar at The World Maritime University and we started discussing human factors. Lloyd's Register, he said, was becoming concerned because an increasing number of engine failures, which in the past were more often material failures and systems malfunctions, were now increasingly occurring because of human involvement.

For my part having edited for eleven years the *Incident Desk*, a monthly review of accident investigations, for The Nautical Institute's journal *Seaways*, a similar pattern had emerged. These discussions led, some months later to the first edition of the **Alert!** bulletin, a project devoted to all aspects of the role of the human element in shipping.

This is the 40th and final Issue which Commodore David Squire has so ably edited with the cooperation and expert advice provided by Dr Jonathan Earthy of Lloyds Register, while also being supported by a host of well-informed correspondents from all parts of our international shipping industry.

The practical approach to the design of the publication with its accessible centrespread, has created a reservoir rich in nourishment; and further governmental initiatives like Human Element Leadership and Management (HELM) Training courses means that the experience implicit in the **Alert!** bulletins is being shared and discussed as an ongoing programme.

While the term human element can mean almost anything, the application of the principles need both a sense of purpose and direction. What we have with the **Alert!** volumes is much more than just a reminder. We have a refined vocabulary, and a resource from which to question, review, explain and apply those principles which are going to be the most effective in any given situation. With practice, human element thinking can become a valuable life skill to be assimilated and used whenever appropriate.

The **Alert!** Project has provided us with an invaluable reference and a vehicle to improve the effectiveness of communication. The leadership challenge now is to embed this rich resource more deeply into our industry's culture.

*With practice,
human element
thinking can
become a
valuable life
skill to be
assimilated and
used whenever
appropriate*



The **Alert!** legacy

Professor Vaughan Pomeroy, Maritime and Safety Consultant

As with many successful ventures, **Alert!** owes its existence to a chance discussion; in this case with Julian Parker during a flight between Genoa and Stansted. From this simple beginning the project has produced more than 300 pages of exceptional material, an active web-based resource and other media, all of which aims to increase awareness in a broad range of human element issues. The material is freely available, and now the maritime industry too must take over and deliver real benefit through increased awareness, training and better practices.

The editor has somehow persuaded many contributors to provide articles which support the forty themed issues. The attractiveness, and the learning effectiveness, has been greatly improved by amusing, but relevant, cartoons and the excellent centrespreads. Looking back on the original idea, the **Alert!** project has delivered far more in terms of education and learning resource material than we could ever have anticipated, all of the highest quality.

The real question is whether the intended improvement in awareness has been attained, and whether this pulls through into a reduction in human element related incidents on ships. It is still too early to tell, but at least the industry now has access to high quality materials and the tools that will help to make the changes to deliver the reduction we all seek to achieve.

Of course, this project has cost a large amount of money, to prepare and distribute the bulletins – there have been more than 2.5 million paper copies distributed worldwide. That investment, for the benefit of the maritime industry, by Lloyd's Register Foundation, is to be applauded as a genuine and progressive attempt to kick start an industry-wide effort to improve personal safety and to reduce the frequency of human element-related incidents.

Alert! is unique – no other industry has attempted this sort of programme. The complete resource is the **Alert!** legacy, that must become widely used for the benefit of the whole industry.

*... the industry now
has access to high
quality materials
and the tools
that will help to
make the changes*

Addressing the human element

Human resources considerations

Recruitment

- Crew nationality
- Language onboard
- Selection criteria
- Physical characteristics for the tasks to be done
- Terms & conditions of service
- Appropriate competencies
- Appropriate experience
- Disciplinary & complaints process
- Leave & travel arrangements
- Medical screening

Manning

- Minimum safe manning compliance
- Tasks, duties & responsibilities
- Numbers, grades & roles
- Watchkeeping patterns
- Hours of work & rest
- Fatigue management
- Retention measures
- Continuity at handover
- Succession planning
- Promotion paths

Education & Training

- Required knowledge, skills & abilities
- STCW competencies
- System-specific training
- In-house/onboard training facilities
- Management/leadership training
- Technical training
- Safety & security training
- Induction
- Onboard familiarisation
- Safety drills
- Onboard continuation training
- Distance learning
- CPD

Social & organisational considerations

Organisational Configuration

- International conventions & regulations
- Industry best practice
- Company structure
- Roles & responsibilities
- Company standing orders
- Organisational culture
- Staffing
- Communication & connectivity
- Job design
- Career development

Social environment

- Intended role
- Security as practiced
- Safety as practiced
- Trust
- Ethos, core values, pride, allegiance
- Individual habits & personality
- Leadership styles
- Health & wellbeing awareness – mental & physical
- Risk awareness
- Communication/working language
- Team dynamics

Ways of working

- Environmental/capability stressors
- Impact of fatigue/stress
- Degree of automation
- Policies, processes & procedures
- Guidelines & practices
- Working hours
- Methods of communication
- Information sharing
- Recording, reporting & feedback procedures
- Easy to understand operating instructions & procedures

Achieved through Human

Habitability

- Religious & cultural differences
- Need for privacy
- Bathroom facilities
- Messing arrangements
- Facilities for personal recreation & study
- Communications connectivity
- Need for natural light
- Storage space for personal effects
- Furnishing, interior design & decoration
- Cleanability
- Surface coverings

Manoeuvrability

- Potential weather conditions
- Communications
- Minimum/maximum/manoeuvring speed
- Propulsion/manoeuvring systems configuration
- Critical system redundancy
- Available harbour services
- Through-life costs
- Protection of the environment
- Fuel economy

Workability

- The users
- Tasks
- Fitness for task
- Equipment
- Accessibility
- Communications
- Signage
- Protective equipment
- Size, shape & gender
- Strength & stamina
- Posture

Human factors considerations

Factors Engineering (HFE)

Maintainability

- Shipboard maintenance policy
- Through-life support
- Onboard expertise
- Accessibility
- Provision & location of tools
- Location of heavy spare parts
- Bench space
- Removal routes
- Noise protected communications
- Policy for onboard spares
- Storage of spare parts and supplies
- Handling of heavy parts
- Disposal of parts & equipment

Security

- Company/ship physical, documentary & cyber security policies
- Human threat landscape (error, misuse and abuse)
- Relationship between security and safety
- Updating of security knowledge
- Seafarer role in protective measures
- Training for confidence and knowledge
- Awareness of, and response to, threat
- Team cohesion
- Management of security risks

Occupational Health and Safety

- Company/ship occupational health & safety policies
- Health & wellbeing
- Personal health
- Health awareness – mental & physical
- Short/long term hazards to health
- Safe working practices
- Tripping/falling/bumping/crushing hazards
- Provision, maintenance, access & use of PPE
- Accident recording, reporting, investigation & feedback

Controllability

- Control room, workstation, display screen layout
- Computer dialogue design
- Controls & switches
- System integration
- Communications
- Alarm philosophy & management
- Direct & peripheral vision
- Daytime/night-time vision
- Dazzle
- Reflection
- Glare

Survivability

- Availability of manpower
- Emergency response systems & procedures
- Ship layout & equipment fit
- Firefighting & damage control systems & equipment
- Lifesaving appliances
- Personal Survival & medical kits
- Search & rescue communications
- Escape & evacuation routes
- Crisis management plans

System safety

- Hazards to/from crew
- Human element in analysis of risks
- Human element in treatment of risks
- Ability to respond
- Ability to monitor
- Ability to learn
- Ability to anticipate
- Business imperative
- Potential for human & organisational error
- Potential for environmental damage & pollution
- Training & familiarization

Human element **considerations** will raise human element **issues** which if not addressed can become system **hazards**.

In ship design and operation this list of Human Element considerations should be examined for issues.

Where these are identified the potential hazards to effectiveness, efficiency, safety and user satisfaction should be assessed and addressed as appropriate.

To download this centrespread together with associated centrespreads go to www.he-alert.org/docs/published/he01355 or scan the QR Code





A valuable service to shipping

Thimio E. Mitropoulos KCMG, IMO Secretary-General Emeritus
Patron, **Alert!** project

The news that, after 12 years and 40 issues, the **Alert!** bulletins would cease to be published came as a surprise.

Unlike the surprise I felt upon hearing that Lloyd's List would go digital – an eventuality I knew would happen sooner or later – the **Alert!** case was, in my view, a quite different one. Mainly because I thought that, at a time when we place increased emphasis on the human element, the success of **Alert!** in promoting the issue was undeniable. In fact, I would expect that, given its success, it would be reinforced rather than wrapped up.

The importance of the human element in all facets of the shipping industry has, over the last 40 years, been widely recognised – and rightly so.

In spite of the great strides technology has been making on a daily basis, the human element has a crucial and indispensable role to play in the regulation of the industry; in the design, construction, equipment and operation of ships; and in the education and training of the various industry stakeholders.

I strongly believe that, while we should spare no effort to improve the technical standards of ships and their performance, including their energy

efficiency, we should, at the same time, do all we can to provide the industry with well educated, trained and motivated seafarers without whom the whole system would collapse. The premise to guide us on this is simple: the world economy cannot do without trade; trade cannot do without shipping; and shipping cannot function without seafarers.

Because of some disconcerting, recently published, statistics showing a significant shortage in the manpower shipping needs in order to continue performing its role, we must make every effort to attract youngsters to the seafaring profession. To this end, we should coordinate and sustain an effective campaign to demonstrate what a rewarding and fulfilling career seafaring is.

In highlighting the above and other relevant efforts and giving examples, from the everyday shipping practice, of what should be done for a safe, secure, efficient and environmentally friendly shipping industry and what, at the same time, should be avoided to prevent accidents at sea, **Alert!** has rendered valuable services to shipping and will, for obvious reasons, be dearly missed when the lights go off.

And so, goodbye **Alert!** and thank you!

We should do all we can to provide the industry with well educated, trained and motivated seafarers without whom the whole system would collapse



Elementary – the human element

Michael Grey MBE, MNM
Patron, **Alert!** project

It ought to be plainly obvious that behind every efficiency increase, each voyage accomplished safely and expeditiously and every accident avoided, people have done something right.

Conversely we know that when the opposite happens and things are screwed up, it will be mostly people who have done something wrong.

So it has been paradoxical and perplexing that until relatively recently, almost all of our regulatory efforts to improve things or to make ship operation safer and more efficient, have revolved around structure, materials, equipment or mechanical systems, rather ignoring that vital ingredient of the human element.

Thank goodness we have largely changed these priorities in recent years and the contribution of the human element is now widely recognised. The **Alert!** project, its sponsors and the Bulletin itself, have played an honourable and important role in this *sea change*, which can be seen to have reverberated all around the marine industry.

Alert! has shown that there is no mystery about the human element, with its influence upon design, build and operation of merchant ships, its emphasis upon good sense and seamanship and the way it has underlined the importance of training, the right culture and attitude. It has shown how integral what is sometimes described as the *man-machine interface* is to safe and efficient ship operations.

Over 40 issues of **Alert!** a range of expert authors from every part of the industry have helped to change people's views on the human element, showing, often with some memorable and easily digestible pictorial centrespreads, that it can make such a difference to ship design, to efficiency and above all to safety.

Alert! may be ending, but it is pleasing to note that the articles and the centrespreads, with information, much of which might be considered *timeless*, will remain available on the website.

... the articles and the centrespreads, with information, much of which might be considered timeless, will remain available on the website



Dealing with the fundamentals of the human factor

Richard L Sadler, Immediate Past CEO, Lloyd's Register

The title **Alert!** is a great name. Making people alert and aware of danger, is as important as trying to design systems to react to danger. Ignoring the human element in design or operation is a fundamental error.

At the opening of the Lloyds Register (LR) Global Technical Centre in the new Southampton University Innovation Campus this year, Princess Anne had some fascinating observations about the dangers of autonomous cars and auto navigation of ships. Her belief was the more that you remove the perceived need for the human assessment of risk, making the individual remote from their environment, catastrophic incidents will still happen unnecessarily.

We all are aware that modern, intelligent systems, can assist with safety, but they cannot diminish the need for awareness of the human factor. It is very good to know that the patron of so many nautical institutions has the human factor firmly at the front of her mind.

The frequently quoted statistic about the number of accidents caused by human error and poor

ergonomics often caused me to question our LR rule development programmes with a concern that they did not pay enough attention to the human factor and instead focussed on the asset design.

That concern gave us increased capability and influence on our Rules and I was always heartened by our involvement when I read **Alert!**. Every article in every Issue over the years has dealt with the fundamentals of the human factor and increased the awareness of every reader. I am sure that we could find evidence that this publication has directly or indirectly saved lives and accidents.

If that is indeed the case, then I would like to thank all those who gave their time and effort in producing **Alert!** over the years. I hope they are very proud of what they have achieved within the marine industry and beyond.

For those reading this Issue with a sense of sadness I trust you will continue to champion human factor issues. In doing so we will contribute together to greater safety, better process, better designs and in conclusion a better industry.

I am sure that we could find evidence that this publication has directly or indirectly saved lives and accidents



Bringing human element issues to the fore

Richard Vie, former Vice President Technical Development and Quality Assurance, Corporate Shipbuilding, Carnival Corporation & plc

As humans we have remarkable decision making skills that are as yet unmatched by even the most powerful computers and artificial intelligence software. Generally, our decision making skills serve us well and keep us safe and secure. However, there are many influences that affect the decisions we make and, if, as a result, the decision is then flawed, it can lead to a range of unwelcome outcomes from the minor scare or near miss to terrible accidents and loss of life.

Some of these influences or factors that lead to poor decisions will be very familiar such as fatigue, the incorrect interpretation of information, a lack of training and competence, etc.

Trying to understand these factors and how they influence decision making is the world of human factors specialists and they probe in to what makes us behave in the way we do under both normal circumstances and in stressful situations such as an emergency.

In the maritime sector this work on the human element has been condensed in to the **Alert!** bulletins which draw attention to the many and

varied factors that affect how both seafarers and shore based staff behave and how procedures and processes can be modified and training and professional development enhanced to reduce the risk of poor decisions being made.

They also describe how the design and build process of ships should take in to account the human element to ensure that accidents are minimized and that all ships' systems are safe to operate and maintain. In other words, that the ship design reflects the fact that the ships of today have to be operated and maintained by human beings and that all the environmental and ergonomic factors that will influence the way that seafarers work and make decisions should be fully taken in to account. This is critical if we are to recruit and retain motivated seafarers to operate our ships in a safe and sustainable way.

As a result, the body of work encapsulated in the **Alert!** bulletins over the last 12 years is of inestimable value in terms of bringing these very important topics to the attention of the maritime sector, and its importance cannot be overstated.

... if, as a result, the decision is then flawed, it can lead to a range of unwelcome outcomes from the minor scare or near miss to terrible accidents and loss of life



Understanding the human element in ship design

Harriet Myles, Ship Science Student, University of Southampton

During the Summer of 2015, I was given the task of indexing the **Alert!** bulletins and writing a document to help ship science students understand the human element in ship design.

Before that, I had actually never heard of the term *human element*. During my course when we had a go at concept design we kind of hit on the subject when trying to fit seats into a ferry, and were trying to think how much space they needed and what was the minimum size a toilet can be. If we had applied human-centred design, we would not have been worrying about this after we had our hull form. The design would have been started by looking at the user and what they need and how much space they would take up.

Throughout this project I have been discussing with people what I have been doing. This has led to some interesting replies. Talking to one of my fellow students, he'd never heard of the human element and to him it all sounded *a bit psychological and complex*. In some ways the human element is psychological, but this is only a part of the subject, as is made clear by the centrespread of this Issue.

Another student gave a very blank face of what was I on about. Then I thought I would ask an aeronautical engineering student. He said: *"I think we make sure the human fits in and can reach the controls."* Whilst talking to someone else who isn't part of the marine industry their view was *"isn't it obvious, doesn't it already exist?"*.

This shows that we are quite behind in not looking at the human element and that people outside the industry would expect better human factors. A former student who came to watch our presentation on the human element now believes it is a subject that is important and needs to be addressed.

The most interesting responses I got were from a submariner and a rating in the Royal Navy. The submariner told

me to stop asking questions and just go on a submarine. This is the view of many seafarers - that the designer should understand how the ship works in order to design one.

The rating was all too happy to tell me all the issues he has on board, such as: 18 people to 3 showers and one small room for eating, resting and any other activities, which can cause a lot of infighting between the crew and affects the way they work.

... we are quite behind in not looking at the human element and that people outside the industry would expect better human factors

I believe these views show much of what I have found in **Alert!** - the seafarers want the human element to be addressed and the naval architects are unclear on what really needs to be done.

This then explains what I did this summer: writing 2 documents so that ship scientists can learn about the human element.

Firstly, an Index to **Alert!** categorised under the considerations in the centrespread to this issue. The main points from all the **Alert!** articles are bullet-pointed under each heading, so as to make it easier to find them from within the whole series of **Alert!** bulletins. And, a table with the main headings again with every **Alert!** article indexed under each heading. This is to make it easier to find specific articles needed from certain issues.

Secondly, *The Human Element in Ship Design* - an introduction to the human element for those involved in the design of ships and their systems.

Alert! Index downloadable from: www.he-alert.org/docs/published/he01360

Human Element in Ship Design downloadable from: www.he-alert.org/docs/published/he01365

Issues 1 to 40 of the **Alert!** bulletins and associated centrespread features can be downloaded from:

www.he-alert.org/en/all-issues.cfm

Bound editions of Issues 1 to 12 and 13 to 21 can be purchased from The Nautical Institute Publications Shop at:

www.nautinst.org/en/shop/

View our short high-quality videos for a unique insight into the importance of the human element in shipping and its impact on maritime safety.

Downloadable from:

www.he-alert.org/en/videos.cfm

Alert!

The International Maritime Human Element Bulletin

Editor: David Squire, FNI

Published by the Nautical Institute, the world's leading international professional body for qualified mariners

www.nautinst.org
Membership info: sec@nautinst.org

The opinions expressed herein are those of the editor or contributors and do not necessarily represent the views of The Nautical Institute or Lloyd's Register Foundation.

The Nautical Institute and Lloyd's Register Foundation, their affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to as 'The Nautical Institute and Lloyd's Register Foundation'. The Nautical Institute and Lloyd's Register Foundation assume no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this Bulletin or howsoever provided, unless that person has signed a contract with an entity from The Nautical Institute and Lloyd's Register Foundation for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

Masthead image:
Andrej pol/Shutterstock

Printing: Indigo Press +44 (0)23 8023 1196

Website: Pixl8
www.pixl8.co.uk/ +44 (0)845 260 0726

Design & artwork production by:
Jacamar (UK) Ltd. www.jacamar.co.uk

This bulletin is distributed and promoted with the kind support of:
Global Maritime Education & Training Association (GlobalMET); International Federation of Shipmasters' Associations (IFSMA); International Institute of Marine Surveying (IIMS); Institute of Marine Engineering, Science and Technology (IMarEST); International Maritime Pilots' Association (IMPA); NewsLink; Royal Institute of Navigation (RIN); Royal Institution of Naval Architects (RINA)