International Conference on Human Factors in Ship Design & Operation
26-27 February 2014, RINA HQ, London, UK

For more information:
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Over the last 10 years, The Nautical Institute, supported by Lloyd’s Register Foundation has been addressing human element related issues within maritime operations. Studies increase of the design practices and creating a competitive advantage. In the midst of this process, ergonomics (or human factors) becomes unnoticed, which can threaten the safety of on-board operations (e.g., accessibility difficulty of the equipment due to visual impairment and cognitive fatigue), and, in turn, implicate higher costs for the company. Considering this, the research project CyClades intends to gather and disseminate ergonomics knowledge amongst maritime stakeholders (designers, ship owners, end-users and authorities) with the aim of 1) creating awareness of the benefits of ergonomics and the complications that its lack creates; 2) reorganise and prioritise end-user participation; 3) promoting safer and more sustainable ship operation in the maritime transport system, and preventing possible critical situations on board. In order to accomplish this and to best allocate the ergonomics knowledge, the first step necessary lies on identifying the motivators to ergonomics integration, the possible negative consequences of no integration, and the obstacles for integration. Such will be done by examining data collected from four focus groups presented in Lisbon, and by analyzing relevant literature. Expectedly, this will allow us to better define the priorities and key-aspects of our subsequent action plan for disseminating ergonomics knowledge.

FIELD STUDIES INFORMING SHIP’S BRIDGE DESIGN AT THE OCEAN INDUSTRIES CONFERENCE 2014, Viggo Livis & KJ Nordby, the Oslo School of Architecture and Design, Norway

Conducting field studies is an acknowledged approach in design to learn about a product’s users, their activities and the context of use. However, designers of products and systems used at sea often have difficulties gaining access to field sites. For this reason it is particularly important that field research is well performed to be valuable for the design process whenever access to the field is granted. This paper explores how to do field studies in order to support ship’s bridge design. At the Ocean Industries Conference at the Oslo School of Architecture and Design we have conducted 10 field studies on board-offshore service vessels in the North Sea, as part of the Ulstein Bridge Concept design research project. In total 12 of our designers/researchers have spent 1800 hours on board these vessels. We draw on our experiences from these field studies. We discuss which approaches we have found valuable, both for doing the field studies and for the transition of the insight gained from the studies to design. A preliminary observation from our study is that the creation of a standardised operational envelope definition may help enhance the ergonomic integration, the possible negative consequences of no integration, and the obstacles for integration. Such will be done by examining data collected from four focus groups presented in Lisbon, and by analyzing relevant literature. Expectedly, this will allow us to better define the priorities and key-aspects of our subsequent action plan for disseminating ergonomics knowledge.

COFFEE

DEFINING OPERATIONAL ENVELOPES TO SUPPORT HUMAN SYSTEMS INTEGRATION WITHIN FAST CRAFT DESIGN, Trevor Dobbins, STRResearch Ltd, UK

The increasing understanding of the human response to RS and WBV within the marine environment now provides the opportunity to develop more objective/quantified operational envelopes related to RS and WBV exposure. This operating envelope definition gives the Naval Architect an opportunity to develop future designs with an enhanced level of HLS, thus increasing operational effectiveness and safety. The potential use of defined operational envelopes is examined in this paper as part of our experiences from defining these operational envelopes. We discuss which approaches we have found valuable, both for doing the field studies and for the transition of the insight gained from the studies to design. A preliminary observation from our study is that the creation of a standardised operational envelope definition may help enhance the ergonomic integration, the possible negative consequences of no integration, and the obstacles for integration. Such will be done by examining data collected from four focus groups presented in Lisbon, and by analyzing relevant literature. Expectedly, this will allow us to better define the priorities and key-aspects of our subsequent action plan for disseminating ergonomics knowledge.

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THE HUMAN ELEMENT IN SAFE SHIPPING: AIB INITIATIVES, Julie C O’Donnell, UK

This paper presents information reinforcing the continued need to address human element concerns in maritime systems as well as how the American Bureau of Shipping (ABS) is tackling these concerns. ABS human element-related topics include crew habitability, the assessment of safety culture, the identification of potential leading indicators of safety, mariner personal safety, and the application of ergonomics in a maritime environment.

TOWARDS AN UNDERSTANDING OF OPERATOR FOCUS USING EYE-TRACKING IN SAFETY-CRITICAL MARITIME SETTINGS, Flory Birtz, Bjarneussen, Rolls-Royce Marine AS

Maritime operations carried out for the oil industry are safety critical with operators having to monitor multiple displays giving feedback on aspects such as accurate vessel location when operating in deep water. These displays give feedback during operation for both the vessel master and the pilots at the same time as maintaining “constant” awareness of the operating deck of the vessels. During these operations deckhands are often working on deck near dangerous equipment which is being controlled remotely from the bridge. In this paper we report on our investigations into determining focus of attention, categorising eye tracking-critical operational actions. We monitored operators carrying out operations in ship simulators while wearing eye tracking equipment. During these operations we introduced various environmental effects such as strong side-winds that can impact the vessel’s stability, and external events such as entering/leaving port, which required the operators to attend to both the ship’s stability and the external events.

THE POTENTIAL OF INDUSTRIAL DESIGN TO REDUCE ENVIRONMENTAL STRESSORS ON OFFSHORE OIL/GAS INSTALLATIONS, S McCartan and J Wycherley, EDEG UK, Coventry University, K Parkers, Stress Research Group, University of Oxford, UK

This paper examines the potential of Industrial Design to address the physical and environmental stressors that are characteristic of North Sea oil and gas installations. Stressors typically include noise, vibration, and lighting conditions, poor air quality, confined workspace, heavy physical workload, narrow access walkways and steep stairs, and vessel motion, although the extent of exposure varies across occupational groups and different installations. Crowded living accommodations, limited shared facilities and restricted activities are further sources of stress, particularly on older installations. While newer installations have improved design standards, a wider range of recreational facilities, and updated living accommodation, much remains to be done to ensure the safety and health of workers. In this paper we report on our research at this stage, using new approaches to boat design, and the expertise of Industrial Designers, can make valuable contributions to this process. Moreover, the design experience gained would also translate to the design of wind farms and the vessels that service them.
The ability of individuals and teams to successfully complete such operations is the result of competency-based education and training, and their experience. The defined competencies facilitate both training and assessment, which are delivered via classroom, computer-based, and on-water training. Competency-based education and training (KSA). Increasing competence comes from an increasing level of mastery, from basic instructions and skills, to the ability to operate as a crew in extreme conditions effectively interacting with other craft and platforms. To support training and coaching process, performance-profiling, based on sports coaching tools, is being used to support the students and instructors. This acts as an effective tool for providing feedback within the education and training process whilst recognizing the differences and commonalities between the students. For example, as already mentioned, an unmanned ship might pose an interesting challenge for naval architects, this paper will focus on the design of the SCC. The Human Factors issues involved with the monitoring and remote control is easily unanswerable due to the complexity of seafaring it seems reasonable to expect dealing with these issues makes seafaring a multi-facetted and often complex profession that is work at sea demands constant adaptation from seafarers: Crew-members come and go, equipment is replaced, schedules are changed, and critical situations are bound to happen sooner or later. Dealing with these issues makes seafaring a multi-facetted and often complex profession that is changing at a high pace. Furthermore, the Sea Industry has tried to reduce uncertainty for seafaring personnel by introducing standard operating procedures, often supported by elaborated checklists. These checklists are written for specific situations and prescribe specific actions that have to be undertaken in order to avoid the occurrence of an emergency situation. This approach helps seafarers to deal with these specific situations. Due to the complexity of seafaring it seems reasonable to expect the occurrence of situations and events for which there is no checklist available. We argue that dealing with these specific situations and improves processes such as planning, decision making, and teamwork. These generic competences allow seafarers to proactively deal with developing situations, instead of merely reacting to them. In 2010, by amending the STCW in Manila, the IIO took a step in this direction when courses (like Maritime Resource Management, MRM), aiming at improving seafarers’ competences in areas as effective communication and leadership, became mandatory. We view these courses as a stepping stone towards a broader inclusion of non-technical skills into seafarers’ education and discuss possibilities of teaching generic competences in various settings. Considering human factors in ship design process, research on evacuation techniques followed on board. Considering ROPAX vessels have inferred that the number of lives lost in accidents of these ships can be drastically reduced by controlling the rapid freeing action of these vessels. Governed by the Regulations under Safety of Life, Health (SOLAS) Chapter IV, and the Life-Saving Appliances (LSA) Code, a concept has been developed, including the deployment of an Inflatable Buoyancy Platform on the side of the ship which gets closer to the waterline due to heel. A case study on the evacuation of a rolling board ROPAX MV Autoria, 1994 has been made, concluding that the inclusion of such a structure on-board ROPAX vessels shall ensure safer and promising evacuation/ escape procedures on board capsizing vessels.
Registration Form
Human Factors in Ship Design & Operation

26-27 February 2014, RINA HQ, London, UK

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