The approval process for risk based ship systems

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Risk-based design for ships and ship systems aims to develop innovative solutions which for some formal reason cannot be regulated today but can be shown to offer at least the same level of safety as currently required. Risk analysis in design is already used in other industries and applications demonstrate the advantages of risk-based design compared to the traditional design and analysis, e.g. more cost-efficient solutions. Risk-based design is also used in the maritime industry, for instance, in the context of SOLAS II-2/17-based analysis of safety equivalence related to fire safety.

Risk-based design is challenging existing rules and, thus, differs fundamentally from the traditional design. It requires a modernised regulatory framework, i.e. regulations enforced by the regulator to regulate risk-based design, which comprises new approval processes, risk evaluation criteria, risk acceptance criteria for functions/systems and requirements to documentation, verification and key personnel. It is expected that a well defined approval process increases the planning reliability for novel and risk-based designs because responsibilities are well defined for all parties involved.

Within the EU funded research project SAFEDOR, an approval process for risk-based ship systems was developed. Keeping in mind the responsibilities of the flag state and the classification society acting as recognized organization, the new approval process is focused on safety and environmental aspects (compliance with safety and environmental requirements). The paper presents in detail the newly developed approval process for risk-based design of ship systems and considers the work flow for design, construction and operation consisting in six main phases: Preparation, System Pre-Approval, System Design, System Construction, System Installation and System Operation.