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Alternative assessment of passenger ship safety – Early results from the EU project FLARE

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Mitigating flooding risk through passive and active measures is a key step in further increasing the safety of shipping, reducing loss of life and damage to the environment. Accurate modelling of flooding is of paramount importance, considering that this hazard remains the most significant contribution to the overall risk (up to 90% of the risk in passenger ships). Real time estimation of breach size after collision or grounding followed by a reliable flooding risk estimation (residual stability, time-to-sink or capsize vs. ship evacuation time) could be assessed through a screening process from the design stage, monitored during operation and made readily available to the crew during a flooding emergency through a decision support system. This, in turn, would provide valuable feedback to designers in their strife to constantly improve the effect of active and passive risk mitigation measures. The EU Horizon2020 project FLARE (FLooding Accident REsponse) introduces a novel risk-based methodology beyond the state-of-the-art for “live” flooding risk assessment and control, by developing a generic (all incidents in one model) and holistic (active and passive measures) risk model with potential application to new-buildings and to existing ships (which is totally new!).

Along the lines of FLARE, this paper reviews a range of potential applications and Risk Control Options (RCOs), including susceptibility to flooding accidents (pre-accident phase) and risk estimation beyond existing statistics. The susceptibility model is linked to a flooding accident model to assess - based on statistics and first-principles tools - the frequencies of flooding events whilst accounting for pertinent environmental conditions and design parameters, including such novel concepts as the crashworthiness of the ship. FLARE partners are key stakeholders in maritime safety, involved in the development of the probabilistic regulation for damage stability from the outset, with specific focus on passenger ships. After an evaluation of the cost-effectiveness of RCOs, the findings will be submitted to the IMO, suggesting possible recommendations and/or amendments to the regulatory framework.

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