

On the Procedure for the Determination of the Probability of Collision Damage

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Abstract

The present SOLAS regulations on probabilistic damage stability have shown anomalies for irregular or complex compartment arrangements. In this paper it is motivated that the source of those problems can be found in the use of a limited set of crisp, sharp, damage boundaries, which arose from the analytical integration of the underlying Probability Density Functions. A possible remedy would be to postpone the integration process until an actual compartment or set of compartments is evaluated. For practical reasons numerical integration is the most applicable method for that task. This proposal is elaborated and implemented in an experimental computer program, which is used to test the approach on a number of example cases. These tests have shown that there is a numerical deviation between conventional SOLAS and the proposed approach, which comes as no surprise. For practical reasons it is investigated whether new density functions, derived with the conventional method, in combination with numerical integration could lead to numerical compatibility. Finally, the effects of the current work on revision of the SOLAS rules are discussed, recommendations are made and subjects for further research are identified.

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