



RELIABILITY-BASED STRUCTURAL DESIGN

The Society of Naval Architects and Marine Engineers has published the 95-page technical report Reliability-Based Structural Design. The material was compiled by Dr. Dominique Béghin as Chapter 5 for the revised edition of the book, Ship Structural Design, edited by Dr. Owen F. Hughes, and will ultimately be published in that form. It is released now as a T&R bulletin in order to make it available for use at an earlier date.

The capacity of a system to operate without major failures, as characterized by its reliability, is ensured by defining performance standards rather than design criteria. Since there are always uncertainties, and hence some risk of failure, it is impossible to make a structure absolutely safe. Instead it can be made only “sufficiently safe,” which means that the risk can be brought down to a level that is considered by society to be acceptable for that type of structure. It is clear that an objective evaluation of the strength of a given structure is an impossible task. As more and more attention is paid to safety at sea as well as to economic considerations, what every designer aims at is an optimized combination of safety and cost. Therefore, a rational design should rely on a statistical basis and the structural design process must provide the means whereby the designer can ensure that the degree of safety meets or exceeds the required level. Application of reliability analysis techniques to the design of ship structures should improve the ship safety by providing clear distinction between resistance and loads, better knowledge of the safety through appraisal of uncertainties, more coherent calculations, and quantification of risks. The chapter addresses the means by which these goals are achieved.

This publication is identified as Technical and Research Bulletin 2-32. It is issued as a CD and may be ordered through the SNAME web site (www.sname.org) or by contacting Tommie-Anne Faix (tfaix@sname.org) or by telephone 201-798-4800, x-3025) for \$50 (\$25 for SNAME members) plus shipping.