

Image Cover Sheet

CLASSIFICATION

UNCLASSIFIED

SYSTEM NUMBER

511916



TITLE

Application of Probabilistic Corrosion Model for Reliability Assessment of Ship Structural Panels

System Number:

Patron Number:

Requester:

Notes: Paper #42 contained in Parent sysnum #511874

DSIS Use only:

Deliver to: CL



Application of Probabilistic Corrosion Model for Reliability Assessment of Ship Structural Panels

by I.R. Orisamolu, U. O. Akpan and D.P. Brennan

Research and Emerging Technologies Department
Martec Limited, Suite 400, 1888 Brunswick Street, Halifax, Nova Scotia, Canada
B3J 3J8

ABSTRACT

Corrosion is one of the most important damage mechanisms for ship structures and a significant portion of the maintenance budget is directed toward corrosion-related problems. There are several forms of corrosion that could be present in ship panels. The two broad categories in this regard are pitting and general corrosion. Although ship engineers have employed this categorization scheme, the natural morphology of real corrosion defects is usually somewhere between the two. In a companion presentation [1] a random field modelling approach for characterization of the effective thickness of ship structural panels due to corrosion has been developed.

In this work the reliability assessment of the residual strength of ship structural panels based on the random field model of effective thickness is undertaken. Advanced probabilistic reliability techniques namely: the first-order and second-order reliability methods are employed to compute the reliability of corroded ship panels with reference to different failure modes. The merit of the probabilistic approach is demonstrated via the solution of several example problems, and the use of quantitative measures of probabilistic sensitivity to illustrate the most important model parameters and their associated uncertainties is given.

1. I.R. Orisamolu, D.P. Brennan and U.O. Akpan., Probabilistic Modeling of Corroded Ship Structural Panels, to be presented at the 8th CF/CRAD Meeting on Naval Applications of Material Technology, Halifax, NS, May 1999