J-Integral Elastic-Plastic Fracture Mechanics Technology in the U.S. Navy

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Abstract
The United States Navy has historically been interested in the development of fracture safe materials for ship construction, and in developing fracture mechanics criteria for design considerations. Recently, a substantial research effort has been directed to the development of J-Integral technology. The purpose of this presentation is to review recent Navy advances in this area. The main points will include a discussion of the applicability of the J-Integral to fracture in ductile materials, the development of test procedures for $J_{IC}$, recent results in the areas of J-controlled crack growth, dynamic J-Integral properties, and instability criteria based on the $J_I$ versus crack growth resistance curve.

Keywords
Nondestructive Evaluation

Disciplines
Materials Science and Engineering
J-INTEGRAL ELASTIC-PLASTIC FRACTURE MECHANICS TECHNOLOGY IN THE U. S. NAVY

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The United States Navy has historically been interested in the development of fracture safe materials for ship construction, and in developing fracture mechanics criteria for design considerations. Recently, a substantial research effort has been directed to the development of J-Integral technology. The purpose of this presentation is to review recent Navy advances in this area. The main points will include a discussion of the applicability of the J-Integral to fracture in ductile materials, the development of test procedures for $J_{IC}$, recent results in the areas of J-controlled crack growth, dynamic J-Integral properties, and instability criteria based on the $J_I$ versus crack growth resistance curve.

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