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Prediction of Fatigue Crack Propagation of Welded Joint under Variable Amplitude Loading

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Summary: Fatigue cracks may initiate and propagate at welded joints of marine structures due to repeated wave loading. When fatigue cracks are detected in service condition, it is preferable to have an evaluation tool to determine the necessary countermeasure action with minimum intervention to the operation. For this purpose, the authors have been developing a prediction system of fatigue crack propagation, "CP-System". In the present paper, the crack opening and closing simulation is applied to structural components in welding residual stress so that fatigue crack propagation can be reasonably estimated for welded structures under variable amplitude loading. In order to confirm the applicability of the proposed method, fatigue tests using base metal specimen and welded joint specimen are carried out. The predictions were found to be in good agreement with various fatigue test results including variable amplitude tests

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