# 모사시편시험을 통한 감육부 국부손상 기준 개발

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# Development of Local Failure Criteria of Wall Thinned Area by Simulated Specimen Tests

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**Key Words:** Local Fracture Criterion(국부순상기준), Simulated Specimen Test (모사시편시험), Wall Thinning Area (감육부), Finite Element Simulation

**Abstract :** The objective of this study is to develop the local failure criterion at a wall-thinned area of piping components by simulated specimen tests. For this purpose, a series of tensile tests was performed using several types of specimens with different stress state under tension, including smooth round bars, round notch bars (three different notch radii) and grooved plates (three different groove radii). The results of notched round bar tests were simulated by elastic-plastic finite element (FE) analysis, and were compared with simulated results. From the comparisons, the criteria which can accurately estimate maximum load and final failure regardless of notch radius, were proposed. Also, the criteria were verified by employing to the estimation of maximum load and final failure of grooved plates specimen tests.



# 피로수명 예측을 위한 반응표면근사화

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# Response Surface Approximation for Fatigue Life Prediction

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**Key Words:** D-optimal Design(D-최적계획법), Sequential Quadratic Programming(순차이차계획법), Rainflow Counting(레인플로집계), Variable Amplitude Loading(변동하중)

**Abstract :** This paper presents a method for considering fatigue life requirements in the optimal design of structures. The basic concept is to use the load history data combined with the finite element stresses of the structure and the material fatigue properties to calculate the fatigue life during the optimization process. Response surface methodology is used to construct response surface approximation for the fatigue life of structures with complex geometry and loading conditions. Thus, this study estimates fatigue life using rainflow counting and Palmgren-Miner method for variable amplitude loading and proposes response surface method for optimization. Response surface for fatigue life prediction is generated by D-optimal design method and is applied to optimal design of end beam by using fatigue life as constraints.