

## 압축잔류응력을 부여한 스프링강의 부식피로 수명평가

유형주<sup>†</sup>(부경대 원) · 박경동<sup>\*</sup>(부경대)

### An Effect of Shot Peening on Corrosion Fatigue Crack Growth of Suspension Material

Hyoung-Ju Ryu, Keyung-Dong Park

**Key Words:** Compressive Residual Stress(압축잔류응력), Corrosion Fatigue Crack(부식피로균열), Fatigue Life(피로수명), Corrosion Condition(부식조건), The threshold intensity factor range(하한계응력확대계수)

**Abstract :** In this study, the influence of compressive residual stress and corrosive condition for corrosion fatigue crack was investigated, after immersing in 3.5%NaCl, 10%HNO<sub>3</sub>+3%HF, 6%FeCl<sub>3</sub>. The immersion period was performed 90days. The fatigue characteristics investigation of a spring steel processed shot peening is performed by considering the several corrosion environments in the range of stress ratio of 0.05 by means of opening mode displacement. By using the methods mentioned above, the following conclusions have been drawn: The fatigue life shows more improvement in the shot peened material than in the unpeened material.

## 유한요소해석에 의한 비대칭 압전 복합재료 작동기의 작동성능 평가

우성충<sup>†</sup>(건국대), 구남서<sup>\*</sup>(건국대)

### Evaluation of Actuation Performance of Unsymmetrically Laminated Piezoelectric Composite Actuator by Finite Element Analysis

Sung-Choong Woo, Nam-Seo Goo

**Key Words:** Piezoelectric Composite Actuator(압전 복합재료 작동기), Thermal Analogy Model(열상사 모델), Thermal Residual Stress(열 잔류응력), Dome Height(돔 높이)

**Abstract :** Actuation performance of piezoelectric composite actuator having various stacking sequences was evaluated by three dimensional finite element analysis based on thermal analogy model. Thermally induced residual stresses and dome height were predicted using classical laminated plate theory. Thermal analogy model applied to LIPCA-C2 in order to verify its validity. FEA considering thermally induced residual stresses and dome height showed that the bending behaviors of piezoelectric composite actuator subjected to electric loads were significantly different according to the stacking sequence, thickness of constituent PZT ceramic and boundary conditions. Consequently, an adequate choice of stacking sequence together with proper PZT thickness would induce the superior actuation performance of piezoelectric composite actuator.