

ESPI에 의한 CFRP의 섬유 방향에 따른 진동모드해석

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Vibration Analysis of Unidirectional Composite Plate by ESPI

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Key Words: Vibration analysis(진동해석), Carbon Fiber Reinforced Plastic(탄소섬유강화복합재), Electronic Speckle Pattern Interferometry(ESPI: 전자처리스펙클간섭법)

Abstract : Composite have unique advantage over monolithic materials, such as high strength, high stiffness, long fatigue life, acoustic insulation and adaptability to the intended function of the structure. The basis for the high performance of composite materials lies in the high specific strength and high specific stiffness and in the anisotropic character of the material. The latter provides the composite system with many degrees of freedom for optimum configuration of the material but also with difficult problems in mechanical analysis. The paper describe the vibration characteristics of unidirectional lamina, according to the change of fiber direction using ESPI which can measure the natural frequencies and mode shapes simultaneously with whole-felid. In our results, fiber direction makes nodal line inclined and gives obviously different mode shapes and maximum displacement points. The dynamic behavior of composite at a viewpoint of failure mechanism has to be considered for composite structure.

원전배관용 주조 스테인리스강의 열화에 의한 2축 피로수명 예측

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A Prediction of Biaxial Fatigue Life of Cast Duplex Stainless Steels(CF8M) by Degradation

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Key Words: Biaxial fatigue(2축 피로), Cast Duplex Stainless Steels(2상 주조 스테인리스강), Degraded Material(열화재), Critical Plane(임계면)

Abstract : The multiaxial fatigue test under in-phase and out-of-phase load were performed to study what degradation phenomenon affects fatigue life with virgin and 3600 hrs degraded materials. The various kind of fatigue data for fatigue life prediction were acquired under pure axial and pure torsional load of fully reversal condition. The models which was investigated are: 1) the von Mises equivalent strain range, 2) the critical shear plane approach method of Fatemi-Socie(FS) parameter, 3) the modified Smith-Watson-Topper(SWT) parameter. The result showed that, fatigue life by material degradation are decreased and life prediction which was used the FS parameter is not conservative but the best result.