

강성을 고려한 자동차 부품의 점용접 최적화에 대한 연구

엄재성[†](KAIST) · 주병현^{*}(KAIST) · 이병채^{**}(KAIST)**Optimization on the spot welded configuration of vehicle components considering the structural performance**

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Key Words: spot weld(스팟 용접), optimization(최적화), vehicle component(차체), sizing optimization(치수 최적화)**Abstract :** In the motor industry, the number of spot welded points is closely related to overall cost of the vehicle assembly. A design based on field experience makes redundant spot welded joint. Welded joint are quite critical in the structure, so it is hard to reduce the number. In this study, we optimized the reduction of spot welded points in the parts, as far as the structure retained the structural performance. We chose the material stiffness of the each weld element as a design variable and keeping the natural frequency of fully welded structure as an objective function. Also the survival design index of the welded point was proposed by accumulating multiple optimization results.

정밀광학체지지 복합재료 위성구조체의 설계

안진희[†](경북대) · 김 철^{*}(경북대)**Development of a Composite Optical Bench Structure on a Satellite**

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Key Words: Satellite Optical Bench(위성 광학구조체), Composite Structures(복합재 구조체)**Abstract :** This paper finds the optimal stacking sequence of the satellite composite structures to minimize severe thermal deformations during their orbital operation using GAs and finite element analyses. Then, the optimal design is reinforced to endure the launch loads like high inertia and vibratory loads that are, usually, smaller than orbital loads induced by space environments. The thermal deformation of sandwich panels was minimized at the stacking sequence of $[0/\pm 45]_s$ and that of composite struts was lowest at the angle of $[02/90]_s$. Also there was no buckling in the compressive loading. By vibration analysis, the natural frequencies of the composite components are much higher than aluminum structures (i.e., sandwich panel: 10.7% strut : 27.79%) and the expected stiffness condition is satisfied. Then, a composite optical bench was fabricated for tests and all analyses results were verified by structural testing. There were good correlations between two results.