

Multi-objective Optimization of Pop-up Seat Frame for Lightweight

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1. Introduction

The importance of applying lightweight vehicles technology has been increasing in recent years to counter the country's policy of tightening environmental regulations. The seat of the vehicle plays an important role in relation to the safety and satisfaction of the passengers. Thickness, and materials, but there is a lack of multi-objective optimization considering all of them.

2. Part selection

The contribution of the component is set based on the portion where stress is concentrated in the sinking seat frame. Materials for strength improvement and lightweight were selected according to contribution. The material that can be applied according to the contribution is secured by curve fitting.

3. Finite elements analysis of seat frame

The sinking seat frame is a rear row seat capable of containment and withdrawal, requiring a higher specification than the test specification as the vehicle seat safety regulations are strengthened. Therefore, large deformation occurred in the combination of leg and frame as a result of checking the strain and weak points through finite element analysis of front and rear moment test application with overloading compared to seat test specifications for improved strength.

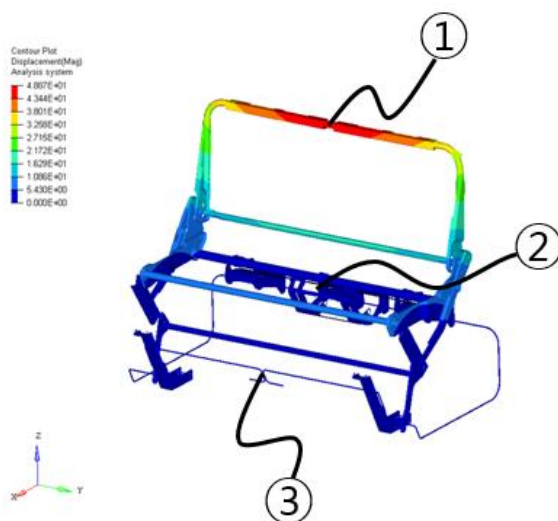


Fig.1 Sinking seat

Table 1 Part name

Number	Name
1	Seatback
2	Cushion
3	Leg

4. Optimization of seat frame

Optimization was performed using the thickness of the part and the applicable material according to the vulnerable part of the sinking seat frame. As a result of the optimization through the experimental design method, it was confirmed that the strength against overload was satisfied.

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