

Optimization for Tubular Torsion Beam Using Hot Stamping Method

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Key words : Hot Stamping, Torsion Beam, Optimization, Finite Element Analysis

1.

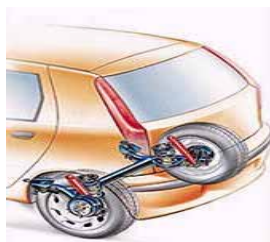
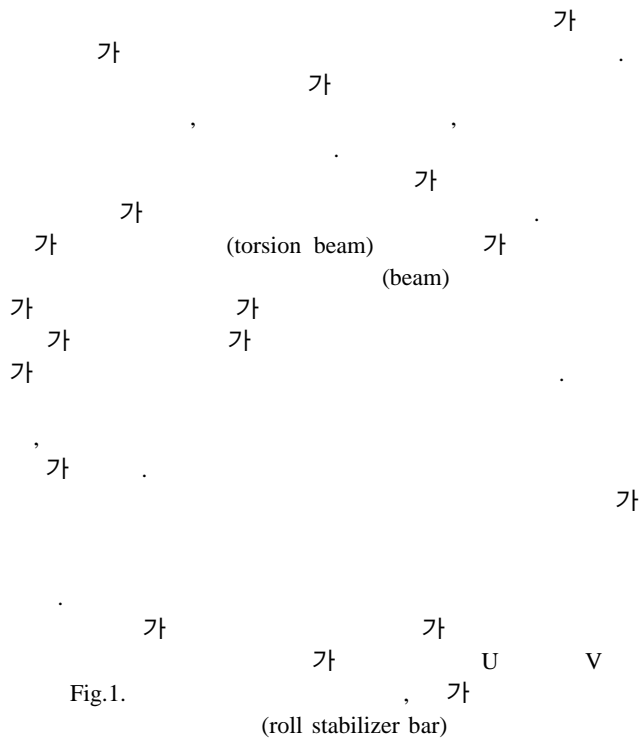


Fig.1 Torsion Beam Suspension

Fig.2 가

3~5

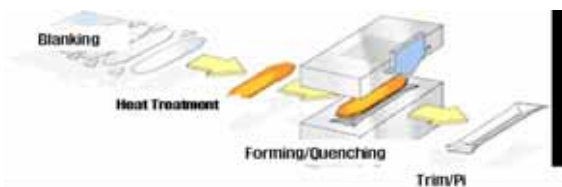


Fig.2 Hotstamping Process

2. Tubular Torsion Beam

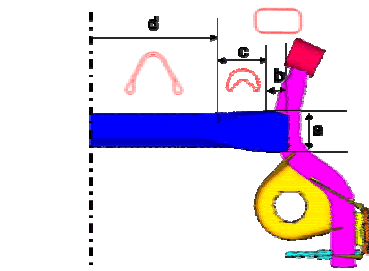


Fig.3 Design of Torsion Beam Suspension

가 c ~ d a,b



(a) Tubular Torsion Beam



(b) Hotstamping Torsion Beam

Fig.4 Design of Torsion Beam

3. Tubular Torsion Beam

3.1

FE

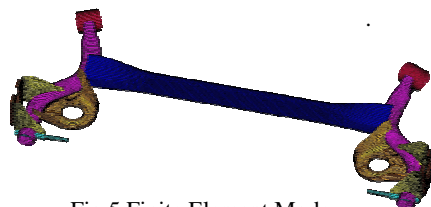


Fig.5 Finite Element Mode

3mm steel mesh
5mm shell mesh

Class	E(N/mm ²)	v	p(sec ² /mm ⁴)
Steel	2.1e+05	0.3	7.9e-09
Weld	2.1e+05	0.3	7.9e-12

Table 1 Material Property

3.2 (Roll Stiffness)

(Roll Stiffness)

$$\text{Roll Stiffness} = \frac{\text{Axial Force} \times \text{Axle Wheel Trade}}{\text{Roll Angle}}$$

2.0t 가

Class	Cold Forming (3.2t)	Hotstamping			
		3.2t	2.5t	2.0t	1.8t
Roll Stiffness (Nm.deg)	533	583	551	531	498

Table 2 Roll Stiffness Results of Torsion Beam

3.3 (Quasi-Static)

2.0t case Inertia Relief

Class	Cycles				
	A	B	C	D	F
Cold Forming	1,890,000	321,000	198,000	554,000	845,000
Hotstamping	3,886,000	751,000	315,000	1,170,000	2,160,000

Table 3 Fatigue Analysis Results of Torsion Beam

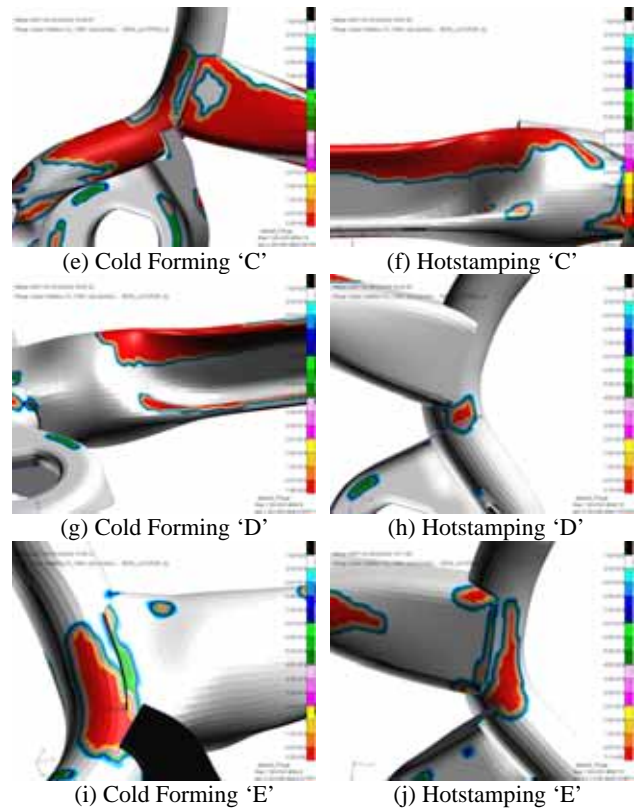
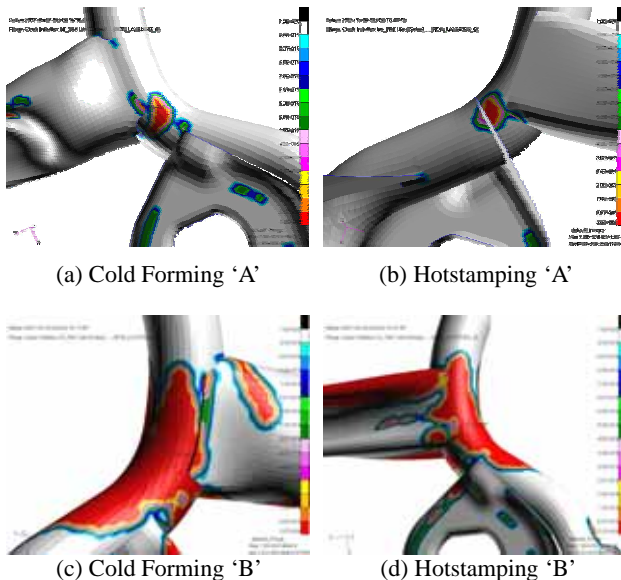


Fig.6 Results of Fatigue Analysis

4.

- 1.
- 2.
- 3.5kg
- 3.
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