

# Development of Ultra Lightweight Parts Using Hot Stamping and Laser Welded Patchwork Technology (3rd Report)

- Application to B-pillar and performance evaluation -

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By combining optimization method, laser welding patchwork, and hot stamping, B-pillar was with more reinforcement effect than spot welding patchwork, a common partial thickening technology. Furthermore, the performance of prototype was evaluated. The procedure is shown below.

## 1) Design and fabrication of laser welded patchwork blank.

In order to control both joining cost and welding fracture during B-pillar forming, patchwork blanks are fabricated with different laser irradiation patterns on ridge side and web side (Fig. 1).

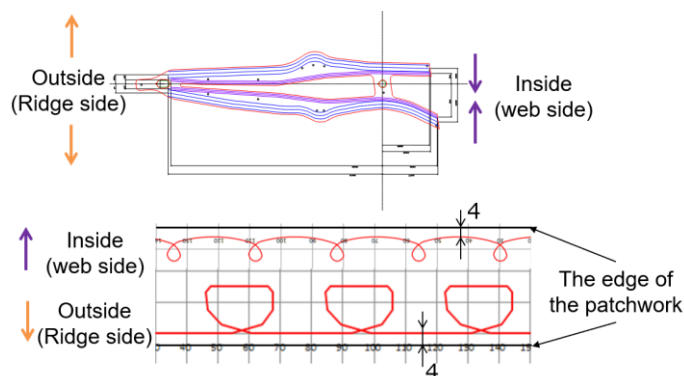


Fig. 1 Laser welding pattern of B pillar

## 2) Hotstamping

By modifying partial patch areas from forming perspective and hot stamping, a laser welded patchwork B-pillars without cracks or wrinkles is fabricated. (Fig. 2).

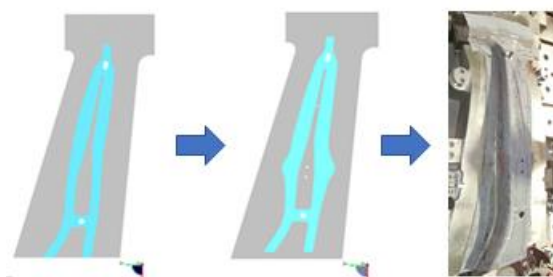


Fig. 2 Patchwork Blank and B-pillar

## 3) Performance evaluation

A performance evaluation test (Fig. 3) based on IIHS was conducted, and trial calculation of weight reduction effect revealed that laser welded patchwork B-pillar had at least 15.4% weight reduction effect compared with spot welded one (Table 1).



Fig. 3 patchwork B-pillar crashing device

Table 1 Test results of Specimen

TP	Material Grade	Welding	Max. moment (N-mm)	Lightweighting percentage
1	1.5GPa	Spot	22.4	0.0%
2			23.1	2.9%
3	1.8GPa	Laser	26.3	15.4%
4			29.2	23.0%