



# 高精度曲げの加工条件の最適化

## —プレスブレーキを使用したV曲げ加工—

### *Optimization of High-precision Metal Bending Conditions —V-bending using a Press Brake—*

赤羽 智夫\*  
Tomoo Akaba

鈴木 義人\*  
Yoshibito Suzuki

大村 欽也\*  
Kinya Omura

A quality engineering study was carried out to increase the precision of V-bending with a hydraulic press brake, using commercially available press brake tooling. Experiments were performed with a novel test piece having three types of holes positioned on the bending line to interfere with the precision of the bend. After bending, the straightness of three lines on one side of the bend was measured, treating deviation from the ideal position determined from the endpoints of each line as a nominal-is-best quantity with zero as the nominal value. Unbalance between the pressure applied on the right and left sides of the press brake was taken as a noise factor. In the first experiment, eight control factors were selected from among the machining conditions, blank conditions, and tooling conditions and the selected conditions were assigned to an  $L_{18}$  orthogonal array. After optimum conditions were determined from this experiment, a second experiment was carried out and a high level of reproducibility was confirmed. When the optimum conditions were applied to actual parts under development, high precision was obtained from one-shot forming. A further advantage was that since commercially available tooling was used, tool procurement time was nearly nil and the tooling cost was reduced by a factor of ten, so development time was greatly shortened and development cost was reduced considerably.

**Key words** : Taguchi methods, S/N ratio, quality engineering, sensitivity, noise factors, control factors, robustness of bending, nominal-is-best response, test piece, bending brake, press brake, die, punch

## 1. はじめに

近年、製品のコストダウンの要望とともに、市場

のグローバル化の急激な進行や、ユーザニーズの多様化などにより、タイムリーな製品開発が強く求められている。その結果、適切な検証を行うため高い精度が要求される製品開発段階の検討用部品も、さらなる納期短縮が必要となってきた。

\*キャノン(株), 正会員