Impact of Fixture Design on Sheet Metal Assembly Variation

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Abstract
This paper presents a new fixture design methodology for sheet metal assembly processes. It focuses on the impact of fixture position on the dimensional quality of sheet metal parts after assembly by considering the effect of part variation, tooling variation and assembly springback. An optimization algorithm combines finite element analysis and nonlinear programming methods to determine the optimal fixture position such that assembly variation is minimized. The optimized fixture layout enables significant reduction in assembly variation due to part and tooling variation. A case study is presented to illustrate the optimization procedure.