



バーチャル設計／テストピースによる 組立ジグ構造の最適化

Optimization of Assembly Jig Structure by Virtual Design or Test Piece

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In multikind small quantity production of human-machine-interface electronic components for automotive use, many complex assembly processes must be carried out by hand with the use of many tools and assembly jigs. A major challenge in tool and jig design is to establish an evaluation methodology for use in the conceptual design stage, but when human factors such as ease of operation are evaluated, conventional CAE simulation is unsuitable. Case studies were made of two promising methods: the virtual design method used for such purposes as product usability evaluation, and the method of making a simple test piece modeling a jig shape with corrugated cardboard etc. and carrying out parameter design. In one case, the shape of a pair of tweezers used in an assembly process was optimized by virtual design; in another case, a palette for applying lubricant was modeled with corrugated plastic and optimized. Both the virtual design method and the test piece method were confirmed to be effective, though with remaining issues. In the future, it is considered possible to expand the use of these methods in total process design.

Key words : virtual design, test piece, assembly jig structure, electronic components, automotive use, human-machine-interface use, multikind and small quantity production, CAE, simulation, parameter design, manufacturing process design

1. はじめに

筆者（上杉）が、バーチャル設計に本格的に注目したのは、コニカミノルタの坂本らの論文「プリン

タにおけるユーザビリティの機能性評価(2)」¹⁾、そして矢野の論説「品質工学における生産システムの設計(1)～(12)」を読んだときからである。

パラメータ設計においては、対象となるシステムを実際に使用して行う実物実験と、CAEによるシミュレーションを行う事例とがある。ただし、ユーザビリティのような人間の感覚を評価する場合に

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