

# New Incremental Forging of Twisted Shape

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## ABSTRACT

Incremental forging is applied to high-mix low-volume production because simple dies can form various kinds of shape by controlling the position of the punch and the workpiece. For example, a pair of dies with different width in feeding direction bends a workpiece in out-plane direction [1], an inclined die bends a workpiece in in-plane direction [2], and a pair of dies with equal width in feeding direction twists a workpiece along the longitudinal direction [3].

By the conventional twist forging, a torsional load is applied between the dies and a manipulator to the workpiece and it causes difficulty in controlling shape; namely, the torsional load may twist the unintended segment of the workpiece between the dies and a manipulator. To eliminate the torsional load, the authors proposed a new incremental twist forging.

The principle of the incremental forging is described as follows: a pair of the die is diagonally placed across the workpiece, they move toward the workpiece, the angular misalignment deformation generates the driving force of twisting, and the force twists the workpiece.

To clarify the deformation behaviour of the incremental twist forging, numerical simulation was carried out by using commercial software FORGE and a model experiment with aluminum was conducted. The results of numerical simulation are in good agreement with experimental results qualitatively. The feasibility of the proposed incremental twist forging is verified in this study.

## REFERENCES

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