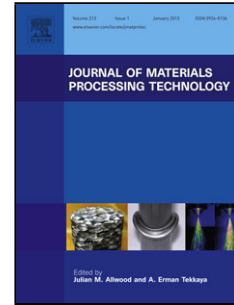


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Research highlights

(1) An accurate design method of the non-rotary upper die is presented based on the geometrical and kinematic relationship between the upper die and upper profile of parts.

(2) A calculation method is presented to obtain the trajectory of any point in the upper die and thus the interference judgment between the upper die and upper profile of parts is achieved.

(3) The metal flow and geometrical accuracy of the non-rotary upper profile of parts can be effectively controlled through optimizing the process parameters.

(4) The process design and control method presented in this paper is valid and cold rotary forging can be used to manufacture the parts with non-rotary upper and lower profiles.

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