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Development of a multi-jet polishing process for inner surface finishing

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Abstract: High-precision inner surfaces are difficult to be machined to a sufficiently high surface quality. This paper presents the development of a novel multi-jet polishing process for precision polishing of inner surfaces through adopting a rod-shaped nozzle designed with a linear array of orifices at its side face. The material removal characteristic on inner cylindrical surface was modelled based on computational fluid dynamic method. Four groups of material removal experiments were conducted to validate the proposed material removal model and investigate its material removal characteristics. Moreover, the surface generation model was also developed and validated based on the material removal model. A series of polishing experiments were conducted on 304 stainless steel cylindrical inner surfaces. The results show that the proposed multi-jet polishing process with the newly designed nozzle is able to achieve high efficiency and precision inner surface finishing on the inner surface.

Keywords: multi-jet tool; inner surface; finishing; fluid jet polishing; abrasive water jet.

1. Introduction

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