聚磁盘形状对磁粒研磨加工管件内表面的影响

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摘　要：目的 提高磁粒研磨法加工管件内表面的质量及加工效率，探究磁粒研磨法中不同形状的聚磁盘对管件内表面的影响。**方法** 利用 Maxwell 软件对轴向开槽聚磁盘与不开槽聚磁盘进行磁场强度模拟和磁感应线模拟，分析不同形状的聚磁盘的磁感应强度变化和磁场强度分布。利用磁粒研磨法对工件内表面进行研磨加工，对研磨之后的工件表面粗糙度进行测量，并对微观形貌进行观察。**结果** 在磁粒研磨工具转速为 500 r/min、加工时长为 15 min 的条件下，聚磁盘为未开槽时，表面粗糙度由原始的 0.509 μm 降至 0.127 μm，表面粗糙度改善率（%Δ*Ra*）为 75.04%；当聚磁盘为轴向开槽时，工件表面粗糙度由原始的 0.553 μm 降至 0.097 μm，工件的表面粗糙度改善率（%Δ*Ra*）为 82.45%。**结论** 在相同的加工条件下，当聚磁盘轴向开槽时，相对于轴向不开槽的聚磁盘，磁粒研磨管件内表面的研磨效果更好，表面粗糙度改善率和研磨效率更高。

关键词：磁粒研磨；聚磁盘；SS304 不锈钢；微观形貌；表面粗糙度

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Influence of Shape of Aggregate Magnetic Iron Plate on Inner Surface of Pipe by Magnetic Abrasive Finishing

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ABSTRACT: The work aims to improve the grinding quality and efficiency of the inner surface of pipe by magnetic abrasive finishing by exploring the influence of different shapes of aggregate magnetic iron plates on the inner surface of the pipe. Firstly, maxwell software was used to simulate magnetic field intensity and magnetic induction line for axial grooved and non-grooved aggregate magnetic iron plates and analyze the magnetic induction intensity variation and magnetic field intensity distribution of different shapes of aggregate magnetic iron plates. Secondly, the inner surface of the workpiece was polished by magnetic abrasive finishing. Finally, the surface roughness of the workpiece after grinding was measured, and the microscopic morphology was observed. When the speed of magnetic abrasive finishing tool was 500 r/min and the processing time was 15

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