

基于虚拟仪器技术的微孔钻削实时监控系统Real-time Monitoring System for Micro-drilling Based on Virtual Instrument Technology

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摘要: 为了防止微孔钻削过程中钻头折断,建立了基于虚拟仪器技术的微孔钻削实时监控系统。该系统以工业PC机为主控机,用霍尔电流传感器监测主轴电动机电流。采集的数据用LabVIEW语言编写的软件进行处理,实现了虚拟示波器、虚拟频谱分析仪、数字滤波器等功能。利用该系统以主轴电动机电流为监测对象进行了实验,根据钻头失效分布函数和可靠度函数的关系确定监控阈值,监测值超过给定阈值时自动报警退刀、提示换刀。实验结果证明,该系统及其监控方法可有效地防止钻头折断,并提高了钻头的利用率。In order to keep drill out of breaking in the micro-drilling process, a real time monitoring and controlling system for micro-drilling was built based on virtual instrument technology. The system took IPC as main controller and used the Holl current sensor to monitor the spindle motor currents. The sampled data were processed by software written in LabVIEW language, which the functions such as the virtual oscillograph, the virtual spectrum analyzer, the digital filter etc. were implemented. In the experiment taking the spindle motor currents as monitoring objective, the monitoring and controlling threshold was determined according to the relationship between the failure distribution function and the reliability function of the drills. When the monitoring value exceeds the threshold given, the feed motion is forced to backward and a warning is given to indicate tool changing. The experimental result shows that the system together with monitoring and controlling method is able to effectively avoid drill breaking and increases the usage of the micro-drill.

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