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激光铣削 PCD 断屑槽路径优化及三维检测

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PCD材料兼顾金刚石的高硬度和硬质合金的高强度，且各向同性好，耐磨性极佳。PCD刀具广泛应用于有色金属和硬脆材料的高效高精加工。PCD断屑槽传统加工方式效率低，激光可实现PCD断屑槽高效高精低损伤加工。但断屑槽具有多个几何特征，加工路径复杂，优化加工参数依然会出现过烧蚀，因此研究路径优化具有实际意义。断屑槽形貌复杂，传统检测方式依赖人工效率低，本文通过处理采集的点云数据可实现断屑槽的高精高效自动检测，并对激光加工的断屑槽进行车削加工检验。

Abstract

PCD material has both high hardness of diamond and high strength of cemented carbide, good isotropy and excellent wear resistance. PCD cutting tools are widely used for high efficiency and precision machining of Non-ferrous metal and hard brittle materials. The traditional machining method of PCD chip-breaking groove is inefficient, and the high efficiency, high precision and low damage machining of PCD chip-breaking groove can be realized by laser. However, chip-breaking grooves have many geometric features, and the machining path is complex, so it is of practical significance to study the path optimization. The chip-breaking groove is complex in shape, and the traditional detection method relies on the low efficiency of manual work, the chip-breaking groove processed by laser is checked in turning process.

Fig. 1 Laser milling of PCD chip-breaking groove after path optimization

关键词： 激光微铣削； 路径优化； PCD断屑槽；去除率模型； 三维检测

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