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Study on position of laser cladded chip breaking dot on rake face of HSS turning tool

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Abstract: Chip breaker with a raised dot was fabricated on the rake face of high speed steel (HSS) turning tool using laser powder cladding method. Based on chip breaking condition and chip breaking dot position conditions, three position equations of laser cladded chip breaking dot were established. The theoretical position regions of laser cladded chip breaking dot on rake face of tool were determined. Turning experiments of aluminum alloy were carried out. Chip breaking processes were observed with high-speed camera. The calculated position regions of chip breaking dot are in good agreement with the experimental results. Turning tool whose center of chip breaking dot is located in the position region on rake face has effective chip breaking ability. There also exists a transition position region of chip breaking dot. The position regions could provide reference for the fabrication of laser cladded chip breaking dot on rake face of HSS cutting tools.

Keywords: cutting tool; chip; chip breaker; laser cladding

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