

TURNING PERFORMANCE OF DIAMOND-COATED INSERT

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ABSTRACT

Diamond-coated tungsten carbide (WC) insert is used for machining of non-ferrous material such as brass, bronze, aluminium alloy, and metal matrix composite. However in this study, diamond-coated insert was subjected to machine medium carbon steel at cutting speed of 60 mm/min, feed rate of 0.254 mm/rev, and depth of cut 2 mm. The machining test was performed on CNC turning machine. The purpose is to investigate the microstructural changes on the flank and crater of the insert and then postulate the failure mechanism of the insert. From the SEM examinations and EDAX analysis, the two-way transfer materials were observed to occur on the worn surfaces of the insert and workpiece. It was postulated that the carbon contents from the diamond diffused interstitially into the work piece materials and formed metal carbides (MC) on the work piece, thus resulted in the blunting of the diamond-coated insert. This failure mechanism prevents the usage of the diamond-coated insert on machining of the ferrous materials even though it is the hardest material on the earth.

<http://journal.masshp.net/wp-content/uploads/Journal/2006/R.J.%20Talib%20127-133.pdf>

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