

Behaviour of PVD multi-layer coating carbide inserts in dry machining of nickel aluminium bronze alloy

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The aluminium bronze alloys have machinability rate from 20 to 40% compared to free cutting brasses, so the cutting parameters and type of tools suitable for machining of these materials may be very different in comparison with other copper alloys. In this study was evaluated the flank wear rate of multi-layer PVD coating carbide insert in dry machining of nickel aluminium bronze CuAl10Ni5Fe5. The new advanced nano-layer coatings composed of numerous layers of the same, or combinations of different coating types can reduce dramatically the tool flank wear compared to conventional monolayer coatings [1]. The CuAl10Ni5Fe5 alloy was machining by CNC turning at different cutting speeds (cutting conditions). The surface and wear of carbide inserts were analysed by Scanning Electron Microscopy / Energy Dispersive X-Ray Spectroscopy (SEM/EDS). The results showed very small flank wear produced by abrasion on the cutting edge even with the increase of cutting speed from 80 to 450 m/min.

References

[1] WEINERT, Klaus et al. Dry machining and minimum quantity lubrication. CIRP Annals-Manufacturing Technology, v. 53, n. 2, p. 511-537, 2004.